AMERICAN FORESTS

OCTOBER 1938

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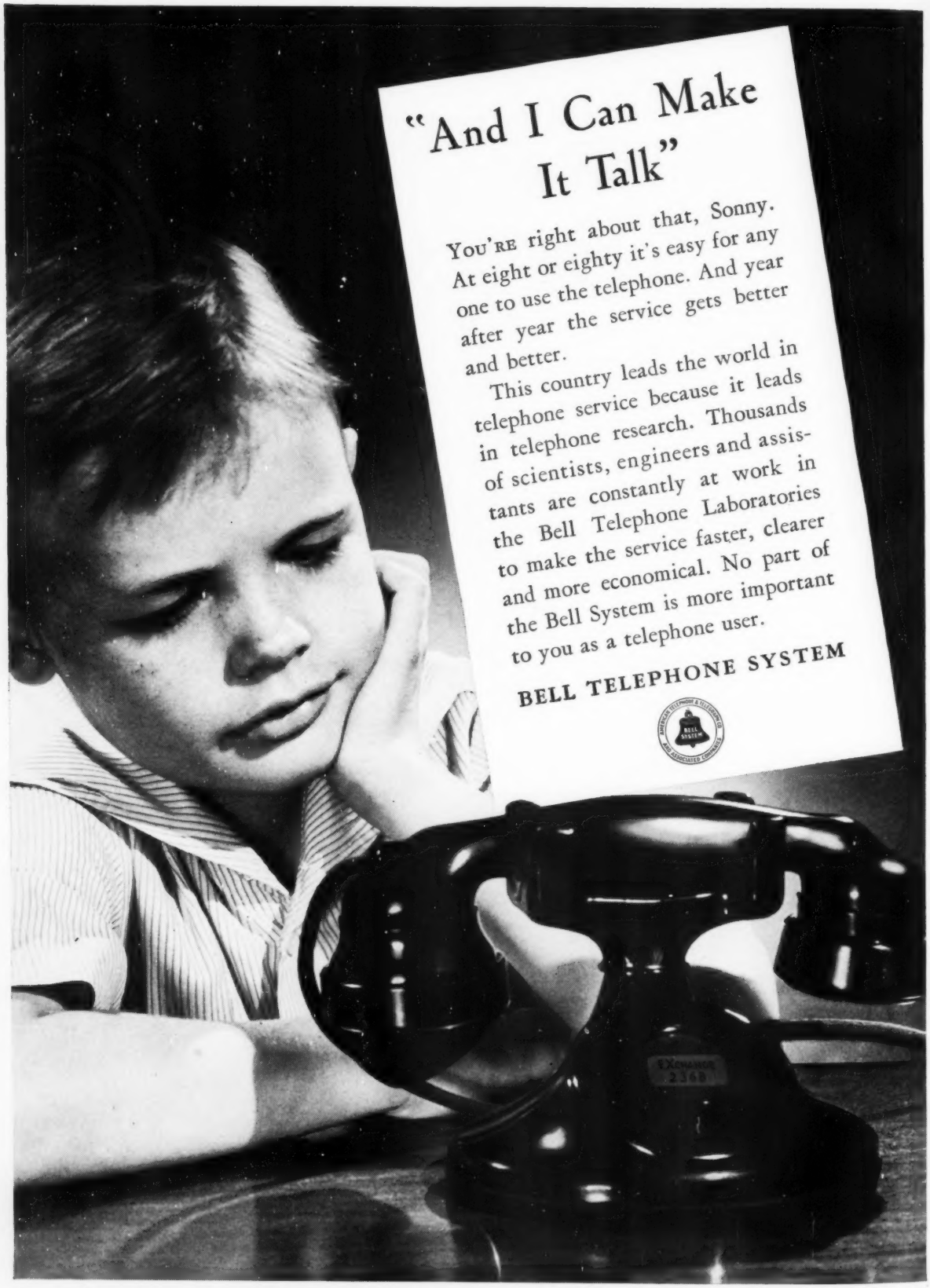
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EDITOR
Ovid Butler
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Lilian Cromelin
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COMING

Few people concern themselves seriously with the feeding habits of wildlife. It is generally taken for granted—if thought about at all—that the dinner pail of the wild is constantly replenished by a loving and bountiful nature. But to one so close to wild things and places as Archibald Rutledge, the feeding of birds and animals in forest and field has an entirely different aspect. Therefore, his *God's Gleaners* in the November issue is a story of unusual quality and significance — one you will read and never forget.

Practical forest management in Europe can show the way to American foresters, thinks Nelson C. Brown, well known educator and author, and as an example he tells the story of a small forest area which has maintained a family for centuries. Read his *Big Returns from Little Forests* in November. In this issue also will be *Flood Forecasting*, by Merrill Bernard, Chief of the River and Flood Division of the United States Weather Bureau, and *Mining Buried Timber* by Charles R. Randall—a remarkable story of the cedar "mines" of New Jersey.

The pictorial feature of the month will be by Leo A. Luttringer, Jr.—a graphic presentation of the drama that goes on behind the scenes in the world of wildlife, a world where the law of survival is truly for the strong — and the lucky.

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Member A. B. C.

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READERS' FORUM

A FOREST PROGRAM FROM MINNESOTA

DEAR SIR:

You are being sent herewith a copy of our report to the Joint Congressional Committee on Forestry. The reason is that we believe you will be interested in some of our proposals which differ appreciably from the thought which has largely dominated American forestry policy in the past.

The chief point of difference is in regard to private forest ownership. In the past majority opinion apparently has been that private forest ownership should be given further opportunity and further encouragement from government before recommending either public regulation or public acquisition. We do not subscribe to this view. In the first place however, we draw a sharp line between the farm woodland as one form of private forest ownership and the large commercial forest holdings as presenting entirely different problems. In all of our public policies and programs here in Minnesota, we attempt to favor and to encourage the private ownership of family-sized farm units. For example, we have a state law exempting homestead units from certain taxes.

When it comes to large commercial forest holdings, we feel that a serious mistake was made when these lands were first allowed to go into private ownership. The way to correct that mistake, as we see it, is not to give further encouragement and aid to the private owner, but to bring the large private land holdings back into public ownership at least until such time as they may be needed for farming.

Here in Minnesota, we believe the private timber operators are ready for this development. More and more they see their field becoming that of logging and manufacturing, with dependence upon farm woodlands and upon public forests for raw material. Personally, I feel that this same solution should be applied to the other forest regions of the country. The cost of acquiring these lands very logically could be paid with borrowed money raised by long-term bond issues at a low interest rate.

As Chief Forester Silcox has said in a recent letter to the National Lumber Manufacturers Association, we cannot permit the repetition of such tragedies as have resulted in the past in such regions as the Appalachians, Ozark Mountains, the cut-over regions of the Lake States and the southern coastal plains, from destructive timber cutting. Moreover, we have got to begin patching up that damage if those regions are to be put back on their feet and the conditions of living of their people built up to decent American standards. The most effective and rational approach, it seems to us, is to bring back into public ownership the forests (except farm woodlands) of these and other regions and to give the underemployed people much-needed jobs in restoring and protecting the forests.

Other points in our reports to which your attention is called are:

1. Emphasis on integration of forestry and farming, including a recommendation for the retention of federal forestry activities in the U. S. Department of Agriculture, and greater recognition of forestry as a conservation practice in the agricultural conservation program.
2. Justification of a more comprehensive public forestry program not only on the basis of potential home markets but also on the basis of probable foreign markets.
3. The need for nation-wide control of destructive timber cutting, to prevent the current glutting of timber markets and to safeguard communities against exhaustion of their basic resources.
4. The transfer of the National Park Service to the Department of Agriculture and there combining it with the Forest Service as a means of achieving coordination and eliminating controversy which now interferes with real progress in conservation.
5. The relation of forestry to major economic problems, first from the standpoint of work programs as a source of labor for forest restoration and development; and second, from the standpoint of the mass purchasing power that is needed if consumers are to utilize the timber which we are able to grow.
6. The question of democratic versus bureaucratic control over public forestry programs, and the need for a new type of administrative setup for national forests placing more responsibility and authority on state and local governments, *but* retaining certain basic controls in the Federal Government.

Very sincerely yours,
E. A. FOSTER,
Director, Division of Forestry,
Department of Conservation,
St. Paul, Minnesota.

(EDITOR'S NOTE: Copies of this report, "Forestry Problems—Objectives and Solutions for Minnesota" are available at ten cents each, from Room 338, State Office Building, St. Paul, Minnesota.)

ELM LEAF BEETLE

DEAR SIR:

I noted in the August issue of your publication a page advertisement on the subject of the elm beetle. The Dutch variety of beetle has not reached Syracuse but this year considerable damage to foliage has been done by the elm leaf beetle which is something on the variety of a lightning bug in size. You probably are familiar with this pest. I am told by the city forester that this variety of insect will not permanently damage the tree unless there is recurrence of the attack over a period of two, three or four years.

Yours very truly,
HENRY PHILLIPS.
Syracuse, New York.

A *three-alarm* JOB !

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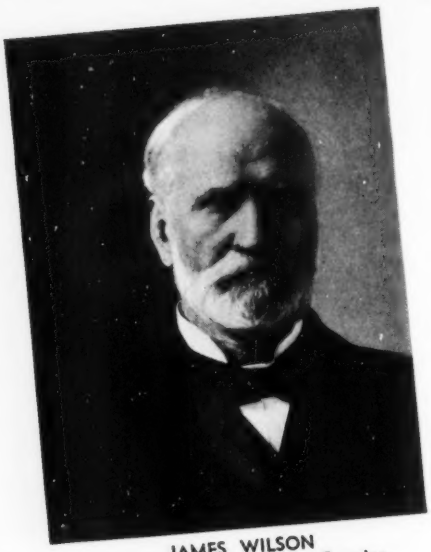

JAMES WILSON
President, The American Forestry Association, 1899-1908

OUR PRESIDENTS

■ James Wilson was elected tenth President of The American Forestry Association at the Seventeenth Annual Meeting in December, 1898, in Washington, D. C. He followed Gen. Francis Henry Appleton in office.

The year 1898 was a significant one for the Association, for it saw the results of its work in definite progress in the educational field. Two great forest schools were established and several more states came into line with forest acquisitions and forestry administrative setups. The Biltmore Forest School was founded in North Carolina under the direction of Dr. C. A. Shenck, noted German forester and educator,—a school justly famed in the years that followed for having given us many of our leading foresters. In that year also the Association started the publication of its magazine, known today as AMERICAN FORESTS.

In 1898 also, on the resignation of Dr. Fernow to head the newly organized New York State College of Forestry at Cornell, Gifford Pinchot was appointed Chief of the Division of Forestry at Washington—truly a landmark for the profession in America, for under his able administration the Forest Service as it is known today was first set up and made its first real progress. And so 1898 found also one of the chief aims of the Association up to that time practically accomplished,—namely, the establishment of a Government system of forest administration. Forestry had become important to the Nation. The Association, even at that time a prime mover in publicizing the subject—expressed its belief in the close connection between forestry and agriculture by the election of "Tama Jim" Wilson, the most prominent and beloved agriculturist of his day, as its President. That his was a wise and successful administration of the Association's affairs is attested by the fact that he served ten terms—from 1899 through 1908.

James Wilson was born in Ayrshire, Scotland, on August 16, 1835, coming to America with his parents in 1851. He served in the Iowa Legislature and as a representative in the National Congress from Iowa. For years he forwarded and participated in educational work in agriculture. Entering the Cabinet of President McKinley in 1897 as Secretary of Agriculture, he served for sixteen years—through the administrations of three presidents—an unprecedented and unbeaten record for any Cabinet officer. Forty Cabinet officers came and went while Tama Jim was Secretary of Agriculture. From 1913, when he left the Cabinet, until near the close of his life he was connected with the *Agricultural Digest*. James Wilson died on August 20, 1920, at the age of eighty-five.

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THE EDITOR'S LOG

THE RECENT primaries and the coming elections promise to influence the membership of the Joint Congressional Committee on Forestry in ways that are disconcerting to those who want to see a thorough and conclusive study made of major forest problems. Already the California primaries have eliminated Senator McAdoo, chairman of the committee, who sponsored the resolution in the Senate. Senator Pope, of Idaho, has also been set aside. While these two men may officially continue on the committee for the present calendar year, their terms of office will have expired long before April first, when the report is due for submission to Congress. Accordingly, their participation will necessarily be reduced if not actually dissolved.

The positions and continued interest of Senators McNary and Bankhead are assured in that neither comes up for election this year, and the recent victory of Senator Smith in the South Carolina primaries leaves little doubt that he will be elected. Each of the five Representatives on the committee comes up for reelection in November, and while none appear to be experiencing special difficulties in the primaries, one can never be sure of an election until the ballots are counted.

It is unfortunate that the work of this committee had to be conducted during an election year. Committee recommendations based upon hurried, superficial and incomplete study may confuse rather than clarify present issues and contentions. As things are going, it would seem better for Congress to let the trees keep growing and the foresters keep talking and to extend its study over a period sufficient to assure a really judicial weighing of public forest needs and policies.

* * * * *

Secretary Ickes last month went into the woods of the Pacific Northwest and apparently discovered that "Greeley lumbermen" are not as black as he painted them in a recent issue of AMERICAN FORESTS. With John Boettiger, son-in-law of President Roosevelt, the Secretary visited the logging operations of the West Fork Timber Company, of which Tom Murray is president. Mr. Murray, a member of the West Coast Lumbermen's Association of which Col. Greeley is Secretary-Manager, is harvesting his company's timber under a selective system of logging.

"We have heard a lot of talk about how selective logging might be done," said Secretary Ickes at the conclusion of his trip. "Mr. Murray instead of just talking about it has done it. His method may well be the means of saving for all time the great timber resources of this region, which, logged by any other methods—the kind of logging methods which laid waste vast areas of Wisconsin, Michigan and Minnesota—would be destroyed."

Mr. Boettiger, in writing up the Secretary's trip in the Seattle *Post-Intelligencer,* concluded his account by saying: "His (the Secretary's) observations may be of much greater import than in connection with his present duties as head of the National Park system, in which no logging of any kind is permitted. Leaders of the national administration are confidently predicting that a government reorganization bill, similar to that defeated by the last Congress, will be approved by the next Congress. If this is accomplished, it is a foregone conclusion that Secretary Ickes will be given full jurisdiction also over all National Forest lands, now managed by the Department of Agriculture. The Secretary will then be in a position *to enforce selective logging in National Forest* lands, and to plan a program looking toward the establishment of similar methods in private operations."

The italics are mine. Can it be that neither Secretary Ickes, who himself indulges in a bit of talk about conservation from time to time, nor the distinguished editor of Seattle's *Intelligencer,* do not know that selective logging, where it is the best system to perpetuate forest growth, has been enforced in the National Forests for the past thirty years? If not, it is to be hoped that they will next visit a few National Forests and see for themselves. Otherwise, it is to be feared that some of the reading public may think that conservation has *just* been discovered.

Ovid Butler

Editor.

The wool shortage in Germany has laid special stress on the production of wood-wool and wood-cotton which is mixed with real wool and cotton in many textiles and fabrics. This shows wood-wool fibers prior to spinning. It takes about one and one-quarter tons of wood-pulp to make one ton of wood-wool

Courtesy Forest Products Laboratory

Wood by the yard in the form of smartly patterned dress goods, — wood-cotton and wood-wool, created by the introduction of wood fibers. At present a certain percentage of wood-wool is required in all German uniforms

WOOD USE TRENDS IN EUROPE

By CARLILE P. WINSLOW

Director, Forest Products Laboratory
Madison, Wisconsin

National Committee on Wood Utilization

The radio tower at Stuttgart, Germany, constructed with modern connectors

MANY articles have appeared in the American press concerning European silviculture practices but little regarding their use of wood. It was therefore particularly gratifying to have the opportunity during the summer of 1937 to observe at first hand current wood use trends and activities in England and France and, as a "fellow" of the Oberlaender Trust, in Germany, Czechoslovakia, Austria, and Switzerland.

In all of these countries one is impressed with a recognition of the importance of efficient wood utilization to the general economic welfare, and with constructive measures being developed to encourage good practice and enlarge wood use. Broadly speaking, Europe's population is dense and increasing, while forest areas are limited and smaller than in the United States. Even with better forest practices their annual cut usually equals or exceeds annual growth. Generally, due to relative scarcity, wood costs are high and per capita wood use is low. Finally, other basic natural resources are much less plentiful within the European countries than here.

To illustrate, in Germany, where the economic situation is acute, the central form of government is distinctive from the other countries visited. Visualize a country of about one hundred million acres, or twenty per cent larger than California. The population of sixty-five to seventy millions is about one-half and the forest area of thirty million acres about one-twentieth of that in the United States. In other words, here is a country with a population density about ten times greater and a per capita forest scarcely one-tenth of that in our country. In addition, the supply of many other essential natural resources, with the exception of coal, is less than we are accustomed to in the United States. There is no gold, oil, gas, or cotton. The agricultural lands of Germany are reported to produce only eighty per cent of the necessary food supplies and there is a shortage of other resources such as iron and wool. Superimposed upon this situation, the government controls forest practices, quantity and quality of timber cut, allocation of wood to different uses, prices of new material and finished products, exports, imports, and wages and hours of employees.

Obviously, this leads to an intensity of forest utilization practices and developments practically and economically impossible under present conditions in the United States. Even Germany's great community forests, about which we have heard much in America, thrive primarily because of a shortage of wood and the nearness of forest supply to points of use. Yet under such favorable circumstances, all the people in a forest community do not get their sole livelihood from the management and cropping of forests. At one private estate, embracing some 50,000 acres of well-managed forested land, a sawmill, pulp mill, and lignite mine are operated within a five-mile radius of a population of 20,000, but only one-fourth of the population is directly or indirectly supported by the forest operations.

While the German situation is distinctive in detail from the other countries, the broad economic situation of population density and limited per capita forest production has its impact upon all European wood use practices. For example, Germany, striving to become self-sustained but still an importer of wood, is reported to be cutting from thirty to fifty per cent more than its annual forest growth. Recognizing wood as its second greatest natural resource, wood utilization is established as a major division of its Four-Year Plan. An active propaganda office disseminates information and encourages good practice, gives support to necessary research through its universities, technical institutions, and industrial concerns, and makes loans or subsidies for the industrialization of new products and processes.

In Czechoslovakia, a timber-exporting country, the

government aids associations of timber owners and timber producers. It actively encourages wider wood use and research for the development of new products.

Austria was similarly encouraging wood utilization, even to the extent of providing a partial subsidy to its rural people to help them install efficient wood-burning stoves for greater economy in the use of wood.

Switzerland, also a wood exporter, has its wood propaganda organization known as "Lignum," whose timberland owner members include the Swiss government. Not only does "Lignum" disseminate information and propaganda but certificates for good products and practices are furnished producers whose wood products meet specified standards of quality and performance. The costs of necessary tests and inspections in promoting this program are paid by the manufacturer.

France is also something of an importer. Yet through commercial organizations and with government contributions, the use of wood is encouraged and a special tax on the wood industries is devoted to education and research. With these funds a Forest Products Laboratory is now being built.

England imports ninety-five per cent of its wood supplies. The work of its well-known Forest Products Research Laboratory is supplemented by wood-use propaganda and development through the Timber Development Association.

Stopping to "fill up" with wood. In Europe, gas from solids is widely used in internal combustion engines. Wood-gas generators and engines are in common use in all sorts of vehicles, from private cars and busses to trucks and airplanes

In addition, the Department of Wood Utilization, with headquarters at Brussels, has been developed during the last three years. Affiliated as this is with the International Committee du Bois it is international in scope. Like the institutions of the several countries, it promotes wider and better markets for wood products and encourages research leading to better practices and new products.

The cumulative effect of such activities must necessarily benefit wood utilization. While specific problems and measures vary in the different countries there is a general recognition of the importance of using available wood supplies for products of high value, such as pulp, wood-wool, sugar, and alcohol, rather than for low-value products, such as fuel wood.

Because of food shortage in Germany and because of the high cost of crude oil and gasoline throughout Europe, attention is being given to the production of sugar and alcohol from wood. Raw wood sugar can be used for animal food, and with refinement for humans. It may be fermented with yeast to form ethyl, or "grain" alcohol to replace gasoline, or it may be used as a source primarily to grow yeast which may be used as cattle food when mixed with nitrogen compounds.

During the World War millions of gallons of ethyl alcohol were made from wood in the United States. At that time grain and sugar were scarce and prices high, but today our farm crops can supply all needs for food, and our oil wells can supply gas-engine fuel more cheaply than we can make it from wood. However, in Europe, improvements of techniques to increase yields and lower costs are impressive. In Germany, the Bergius and Schöller processes are receiving most attention. But even with improved technique, their relatively high wood costs make the cost of alcohol much higher than it can be produced from sugars and grains, and far beyond present gasoline costs in the United States.

A shortage of wool and the fact that Germany has no domestic cotton directs special emphasis to the production of wood-wool and wood-cotton. This is mixed with real wool and cotton in many textile materials and fabrics. By 1939 the production of wood-wool may equal one-fourth of the total consumption of textiles in Germany. Similar production and use is being encouraged in other countries. About one and one-fourth tons of wood pulp are required to make one ton of wood-wool.

The process, similar to that for making rayon, involves passing the dissolved cellulose through "diffusers" which make a thread smaller in diameter than usually used for rayon. This is followed by special treatment and the cutting of the final thread into fibers. At present wood-wool fibers are less flexible than real wool fibers, and their strength diminishes when wet. A mixture of sixteen to twenty per cent of wood-wool with real wool, however, is reported to make a satisfactory fabric. At present a certain percentage of wood-wool is required in all German uniforms.

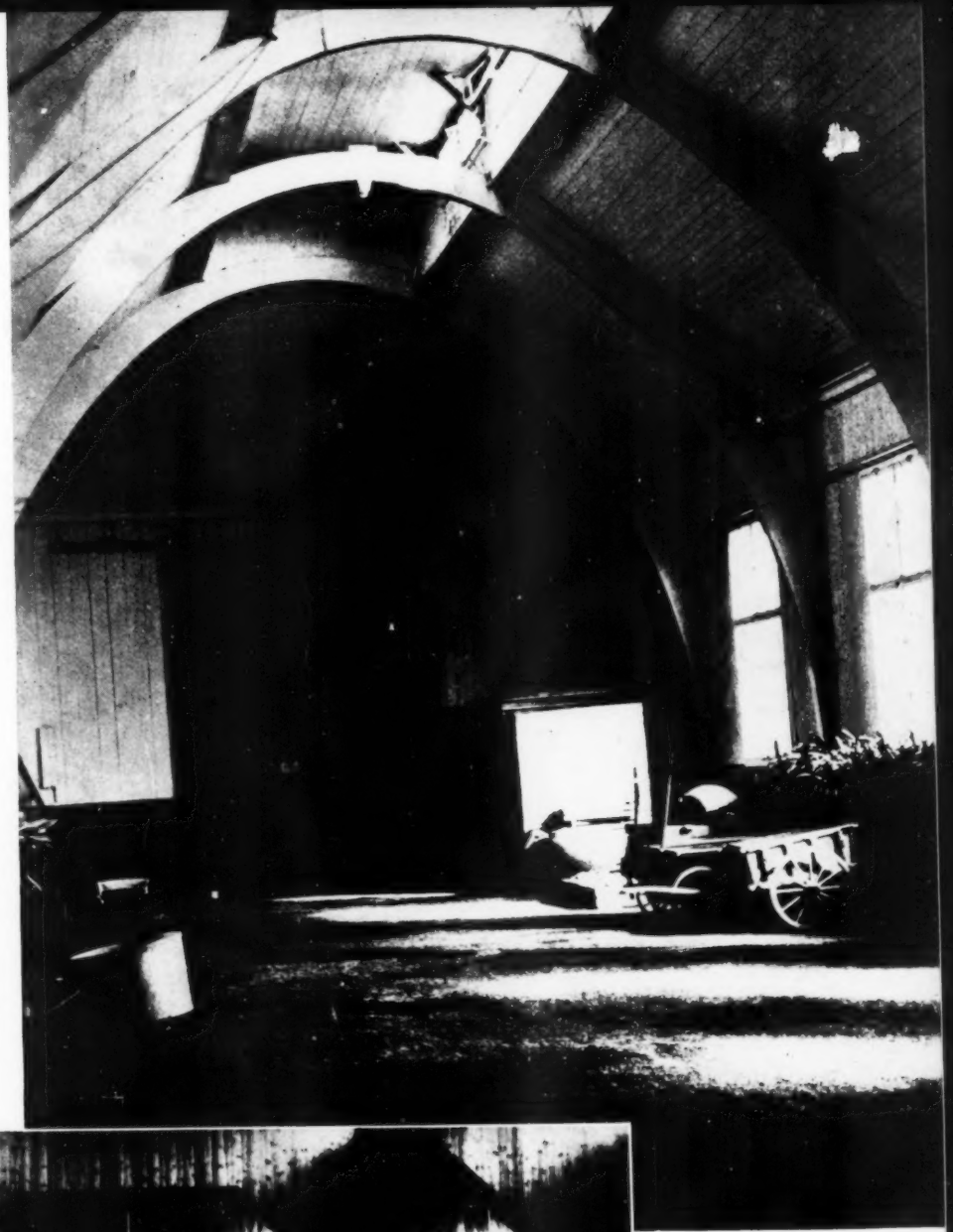
With our abundance of cheap cotton and wool, this development is not so economically significant in the United States, but even here some wood-wool or staple fiber is being produced. Wood-wool is reported to have certain advantages in dyeing, among which are brighter color effects. Furthermore, it can be woven on existing cotton or wool textile machinery.

Lack of abundant supplies of gasoline has directed attention in Europe toward substituting gas from solids for that from liquid fuels in operating gas engines. Gas from wood, coal, peat, and other solid plant materials has been used for a generation. Prior to the World War,

the heavy equipment essential to remove tars limited its use to permanent rather than mobile installations. About twenty years ago the need of heavy auxiliary equipment was avoided by directing the combustion gases through the fire zone where heat is sufficient to crack or consume the tars. This discovery opened the possibility of using gas from solids in all internal combustion engines, a field of vital importance not only in Europe's domestic economy but in national defense as well. Italy, France, Switzerland, Czechoslovakia, and to a lesser degree Sweden and Great Britain, are fostering this development. In Germany, however, where gas-engine fuel by hydrogenation of coal is planned, and wood is needed for other purposes, it is not being so actively pushed.

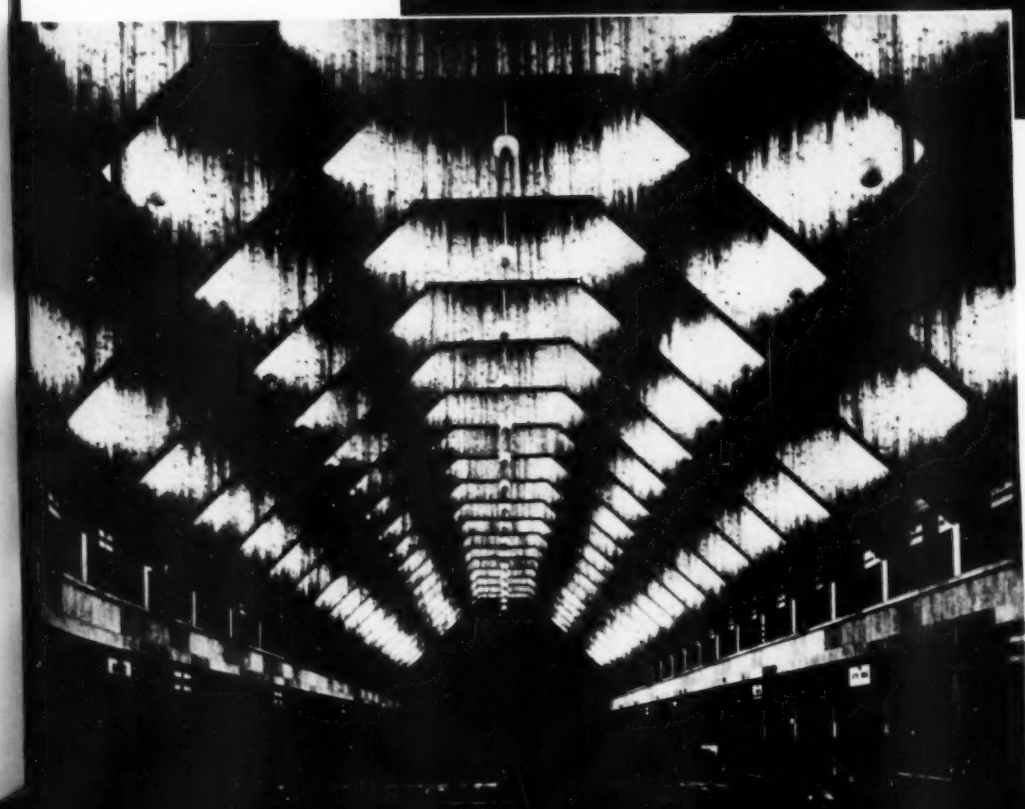
Research work is bringing steady improvement in developing this combination of wood-gas generator and engine, so that it is being applied to busses, trucks, airplanes, pleasure cars, and stationary engines, but the wood must be of proper size and moisture content. Small blocks or fragments whose moisture content is under twenty per cent are commonly used, and some advantage is obtained by mixing

(*Continuing on page* 477)



Forest Products Laboratory

Glued laminated arches used in an agricultural building at St. Gallen, Switzerland

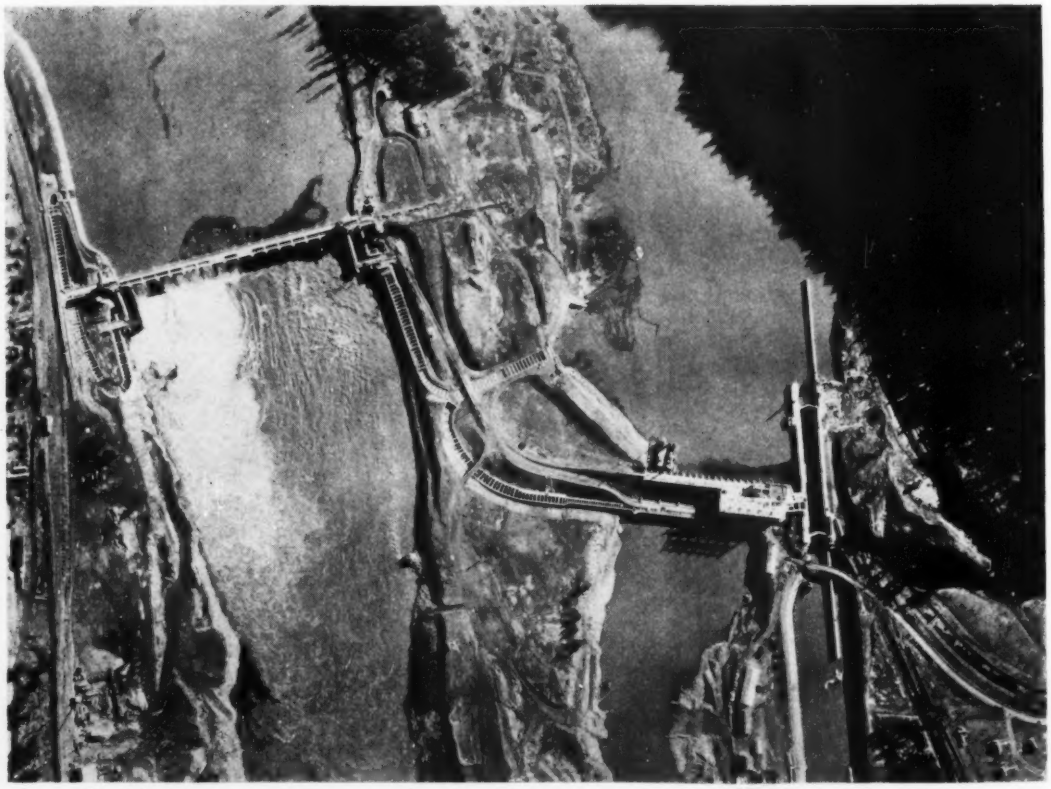


Great exhibition hall at Berlin, Germany — constructed with modern connectors and showing the use of knotty spruce for covering structural timbers. (Courtesy Arbeitsgemeinschaft Holz.)

WHEN SALMON MEET BONNEVILLE DAM

All Important Question of the Effect of the Giant Power Dam on Columbia River Salmon Is Now Being Tested

By LAWRENCE E. GRIFFIN



The Columbia River, with Oregon on the right and Washington on the left, is divided at Bonneville by Bradford Island. Fish ladders are shown at each end of the spillway dam, of which that on the right joins with the "collecting system" below the power house and leads across Bradford Island

"THE Columbia River provides spawning grounds for tremendous runs of salmon, trout, and other migratory fish," according to a recent circular from the United States Engineer's Office at Bonneville, Oregon. "These fish," continues the report, "support a commercial fishery that is not limited to the Columbia River itself, but includes the ocean troll fishery extending along the coast of Oregon, Washington, British Columbia, even slightly into Alaska. The food products of this fishery annually sell at retail for approximately $10,000,000. The number of people deriving their support from the resource is of corresponding magnitude. There is also an extensive sport fishery distributed throughout the Columbia River watershed."

The spawning grounds of the salmon have extended from near the mouth of the Columbia to its headwaters in the mountains of Idaho and British Columbia, and along most of its tributary streams. Already the way to some of these spawning streams has been closed by man-made obstructions. Now comes the construction of two more great dams across the Columbia River, of which the Coulee dam completely prevents the passage of fish into the upper waters. At the Bonneville Dam—only 150 miles from the mouth of the river—serious effort has been made to provide passage for the fish, and a considerable part of the cost of the structure is due to the construction of its fishways.

Considering that the annual net income from the Columbia River fisheries is greater than the income from Bonneville Dam will be for a considerable time, or may ever be, it is easy to understand why many persons are concerned over the effect of the dam on future migrations of salmon.

All species of salmon and the steelhead trout spend a large part of their lives in the sea, but they ascend streams to spawn. Their eggs are deposited in the

gravel of a stream bed, where they hatch in about two months. The young remain in the gravel for some time longer until the yolk of the egg has been absorbed. Then they work their way out of the gravel and as "fingerlings" begin taking care of themselves. Some immediately move toward the ocean, while others remain in the streams for periods of several weeks to one or two years. The length of time the fingerlings spend in fresh water depends upon the species and upon the distance of the spawning grounds from the sea. In fresh water their growth is slow, but it is accelerated after entering the ocean.

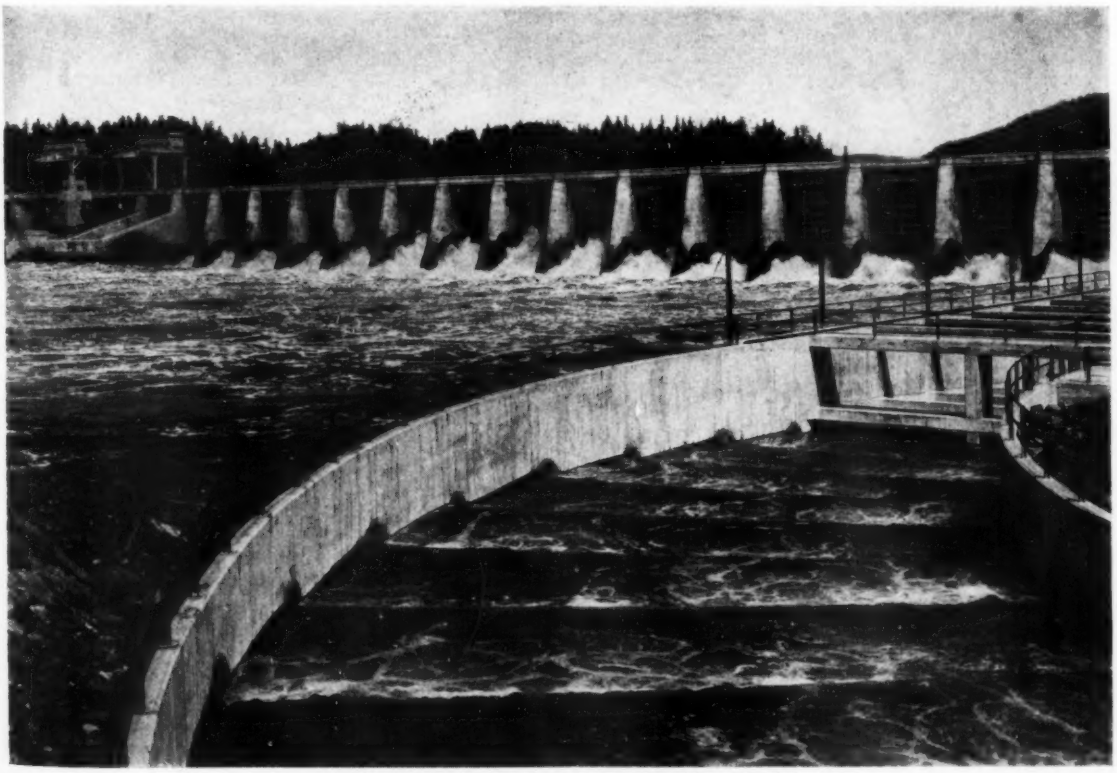
After two to five years in the ocean, when they may travel great distances, they return to spawn in the stream in which they were hatched. After spawning, salmon die. It is as the fish pass along the coast on their way to the spawning streams, and on their passage up the streams, that they are caught by commercial and sport fishermen.

Obviously if mature fish are prevented from going up to their spawning grounds, or if young fish do not have a safe passage down to the sea, the immensely valuable runs of salmon can not be perpetuated. The greater part of the spawning area of the Columbia River is above the site of the Bonneville Dam. Unfortunately, accurate information about the number of fish which go up the river or their distribution in its various tributaries is not sufficient to support detailed statements concerning their number, but if only half the salmon have their spawning grounds above the dam, preservation of these grounds and of open ways to them is of utmost importance.

Anyone who has watched the construction of the dam and has studied its plans must admire the care with which problems relating to fish have been studied. Tribute must also be paid the engineering skill with which structures have been designed and built in attempts to serve the needs of fish for passages over, around, and through the immense structure. The fish ladders, in particular, are the best structures of the kind ever built.

The Columbia River is divided at Bonneville by Bradford Island into two channels; the one on the north of the island being the main one. The dam is really two dams separated by the island. The spillway dam crosses the main channel, while the power house extends across the narrower south channel.

The fishways intended for upstream migrants include three fish ladders, three pairs of fish locks, and "collecting systems" for directing fish to the ladders and locks. An aerial view shows the ladders as stair-like structures on the north and south banks of the main channel. The ladder on the south bank is joined by another which ascends from the south channel below the power house. As Bonneville Dam is intended to maintain a nearly uniform head of water and not to control flood waters, the variation in the height of the river below the dam will continue to be approximately forty feet—much the same as it has been in the past. Therefore, to keep the entrance of the fish ladders of the main channel at the same point in low water periods as in high it has been necessary to provide walls forty feet high for the lower portions of the ladders. The ladders are forty feet wide above moderately low water, and thirty feet wide below this elevation. The pools of the ladders are sixteen feet long and six feet deep, with a difference of one foot in water level between pools. Each ladder has seventy-five pools and is about 1,200



Looking down the Bradford Island fish ladder toward the entrance at the base of the spillway dam

feet long. But not all of the pools will be in use at any time, for a number are submerged by high water, and at low water periods a few pools at the upper end are eliminated by removal of partitions. The fish must ascend from sixty-three feet at extremely low water stages to thirty-five feet at times of freshets. The average is about fifty feet. The steady flow of water over the walls of the pools and the low vertical height between them enables fish to swim easily from pool to pool without the necessity of leaping. The considerable area of the pools and their depth also allows the fish to rest until ready to continue the ascent. At Bonneville the flow of the Columbia River is extraordinarily variable—having been as little as 40,000 second-feet in extreme low water, and over 1,200,000 second-feet in great freshets. When the two turbines now installed in the power house and an additional two, construction of which has been authorized, are in operation they will require nearly the entire flow of the river in extremely low water. Of course, such low water will be for short periods in the winter only. If all the turbines included in the plans of the dam should be operated, there will be several months of the year when the entire flow of the Columbia, except that passing through the fish ways, will move through the turbines. This will cause the water in the main channel north of Bradford Island to become a lagoon without noticeable current, while the river flow will be diverted to the south channel or tail race below the power house. Under these conditions fish ascending the river may be expected to follow the tail race as far as the power house. That they may pass on from here, there has been constructed a "collecting system" of novel design and magnificent proportions. This consists of a horizontal passage extending entirely across the downstream face of the power house and above the openings of the draft tubes which conduct water from the turbines. The downstream wall of the passage is broken by openings through which water may flow from the passage into the tail race, and fish may pass from the tail race into the passage. Part of the water flows down the fish ladder which joins another from the south bank of the main channel. It is expected that fish will enter the passage by the water flow over the weirs and will follow the flow of water to the (*Continuing on page* 468)

(Above) Concrete baffles cross the Bradford Island fish ladder. (Below) Looking up the same ladder from the junction of its two branches, showing the broken flow of the down-rushing water

PYMATUNING

By
LEO
A.
LUTTRINGER, JR.

Young Great Blue Heron on the Refuge

A PARADISE FOR SPORTSMEN

PYMATUNING LAKE, the paradise of which Pennsylvania sportsmen and other outdoor enthusiasts dreamed for many years, is at last an accomplished fact. Beset by litigation and legislative differences for more than a half century, this beauty spot is now in line to become one of the greatest recreational centers in the eastern United States.

Sixteen miles long, from one to two miles in width, and with a shore line of seventy miles, Pymatuning is the largest body of water in Pennsylvania. It lies mostly in Crawford County, although it is traversed at its western end by the Pennsylvania-Ohio boundary. It was formed by impounding the waters of the Shenango River, and was created primarily in the interest of water conservation. The lake also floods the famous Pymatuning Swamp, an extensive morass of 10,400 acres which was formed by the deposition of glacial drift over a pre-glacial lake or river bed.

This great swamp, which a century and a half ago derived from the Delaware Indians the name of Pymatuning—meaning the "Crooked-mouth Man's Dwelling Place"—had been a paradise for shore, song and game bird life for a great many years. At least 244 species have been recorded there at one time or another. Bordering the swamp were pasture and waste lands subject to frequent overflow. Much of this land merged into stump land covered with scrub and stunted second growth brush and weeds.

The marsh was a favorite hunting ground for the Indians; in later years it became a favored area for sportsmen from all over the country. They took from this large swamp great numbers of foxes, minks, rabbits, skunks, raccoons and muskrats. Turkeys, grouse, quail, woodcock, ducks and geese were among the game birds killed there every year.

Pymatuning was also a paradise for students of botany, geology, biology, zoology and ornithology. Groups from various colleges and universities throughout the country made trips to the swamp to study plant and animal life.

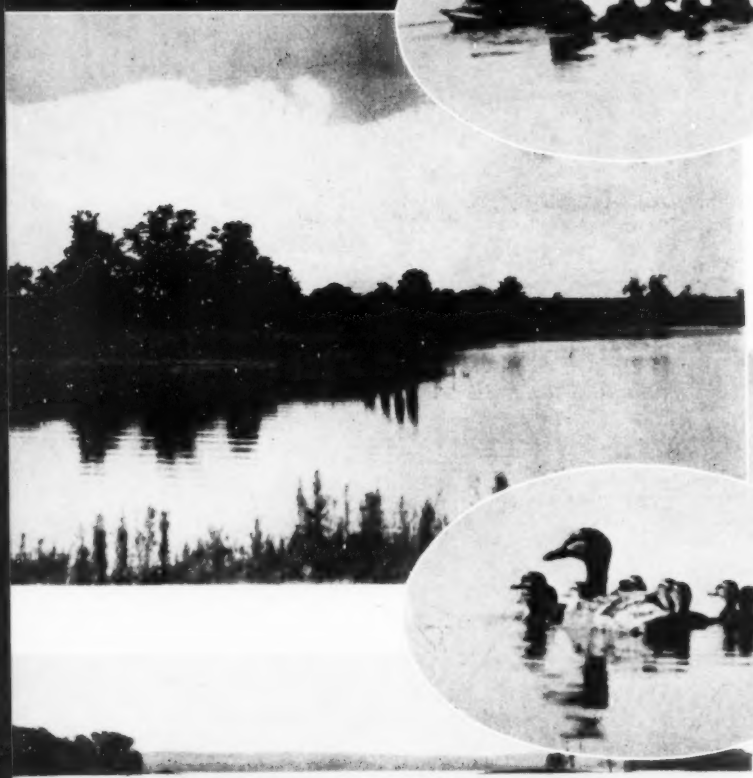
For years conservationists in Pennsylvania and Ohio sought to flood this vast area for the purpose of storing up an immense supply of water for drought relief. Little headway was made, however, until 1907, when the State Legislature directed that a survey be made. Two years later, plans were submitted to the Pennsylvania Water Supply Commission, and out of hearings held by this agency came the development of the giant water storage facility.

The Act approved in July, 1913, commonly known as the "Pymatuning Swamp Act," directed the Commission to erect a dam at the outlet of Pymatuning Swamp.

SHOTS ON THE REFUGE

DAY AND NIGHT

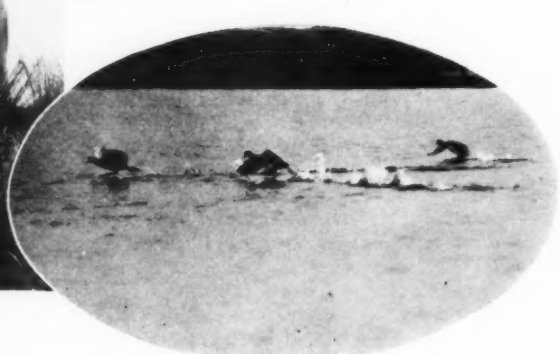
A Black Duck and her young swimming into the sunset on the Refuge



Waltonians galore find the fishing good—whether casting or trolling

A mother Mallard leads her little brood home

A crew planting food for the waterfowl



The take-off

However, the project remained in the surveying and planning stage until 1921, when the State began buying the land now flooded. The dam did not get under way until 1931.

Although the primary purpose of creating this great lake was to provide sufficient water during dry seasons of the year for domestic and commercial uses, recreational and wildlife possibilities of the area have been given every consideration. From the beginning opposition rose from ornithologists who claimed that it was nothing short of criminal to flood the swamp and thus destroy such a natural haven for wild bird and animal life. Proponents of the plan pointed out that the non-aquatic species would soon find homes elsewhere and that the matter of attracting and increasing the vanishing waterfowl was by far the more important problem of the two.

It so happened that the project worked out exactly in this manner. Once cutting operations preliminary to the flooding of the area took place, game officials trapped out all of the valuable game and fur-bearing species of mammals and released them elsewhere. The same thing was done to game birds. Shore birds merely retreated and found other places of safety; song birds had no difficulty in locating other natural environment.

Flood control alone warranted the expense and labor in connection with the establishment of this magnificent artificial lake. During the great eastern floods of 1936, the Shenango Valley suffered virtually no loss, whereas in 1913 the flood damage in the Shenango and Beaver Valleys totalled over $2,000,000. The lake has an area at the elevation of the floor line—1,008 feet above sea level—of 17,880 acres and a capacity of 64,275,000,000 gallons.

A joint Pennsylvania-Ohio Pymatuning Commission was created to consider all matters relating to fishing, hunting, sanitation, law enforcement, use of motor boats, and restrictions concerning the use of the publicly-owned lands bordering the dam.

Pymatuning offers such diversified recreational facilities that it has been declared a state park by the Pennsylvania Department of Forests and Waters. A large administration building, a modern club house, rest rooms and other buildings have been erected there for the benefit of the public.

Cottages are restricted to specified zones so that the general natural environment of the wild creatures will not be disturbed. State-owned land adjoining the lake is being reforested, 1,350,000 trees having already been planted.

While waterfowl hunting was permitted for the first (*Continuing on page* 466)

Enthusiastic fishermen at a favorite spot on the refuge

A young gallinule challenges the world

Plenty for all — everyone had a string

SEEN IN THE FALL WOODS

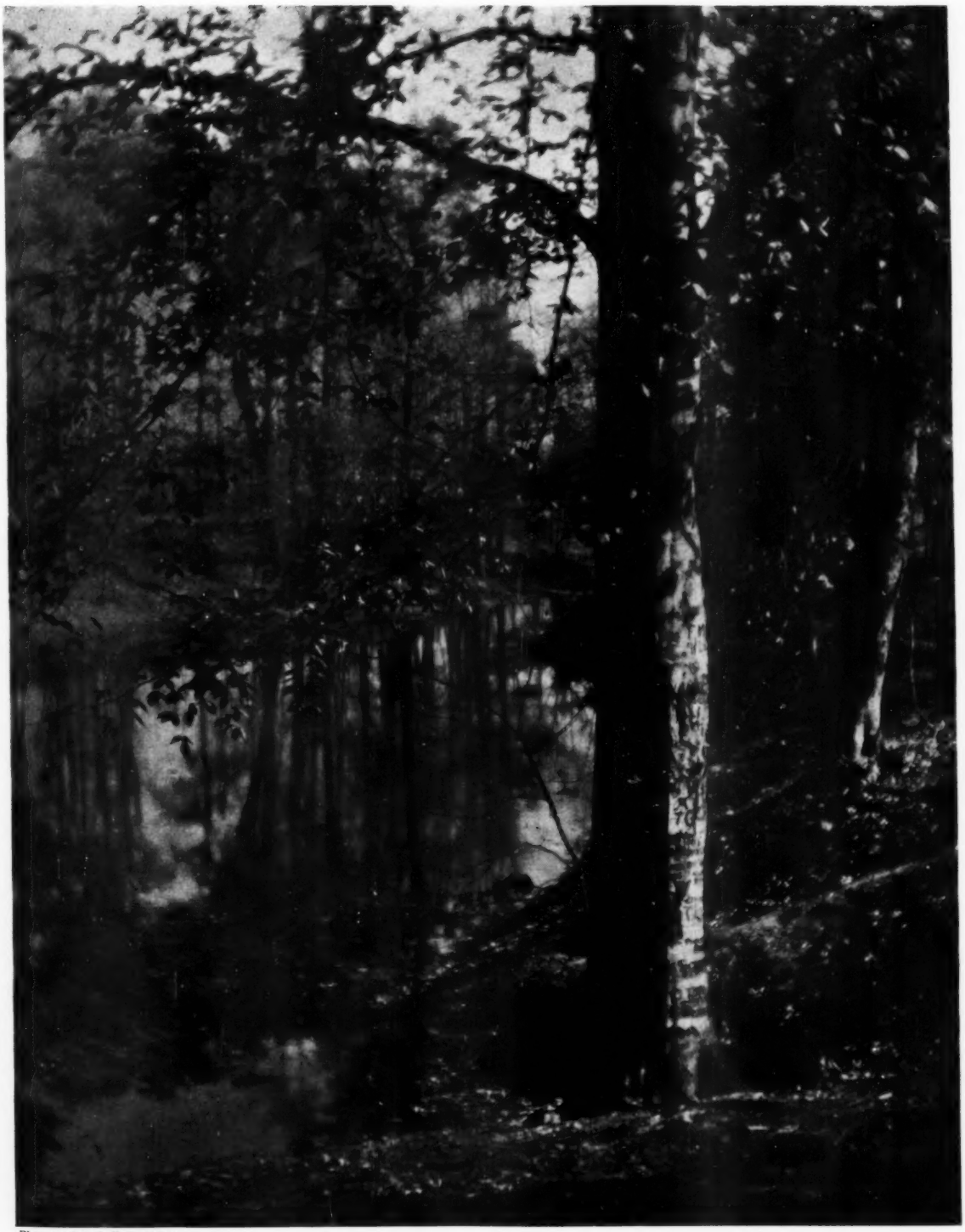
FALL in the woods! Once again the cycle of the seasons rings in Autumn's turn, and Nature weaves a tapestry of gorgeous color as a backdrop for the show. The delicate promise of Spring found fulfillment in Summer's full glory and now, before the long, sweet sleep which is Winter's gift to all nature, Autumn hastens on the scene, her arms filled with the rich fruits that are hers alone to bring. In robes of flaming crimson and burnished gold she decks the trees of wood and forest lane for their last abandoned dance to the music of the winds, and as the wild music ends, softly their leaves fall to the warm bosom of Mother Earth, there to wait the coming of the snows.

FALL in the woods! Even as the last flare-up of a dying torch, so Autumn blazes forth. Then comes the cool, silken touch of first snow on tree and ground, on fallen leaves—deer, moose and the small forest creatures—all part of a slowly moving picture shown to the muted orchestration of Summer's glorious symphony reflected in softened brown tones echoing through forest aisles.

FALL in the woods! Nature's last lovely pause before the coming of Winter, when she must rest until another Spring.

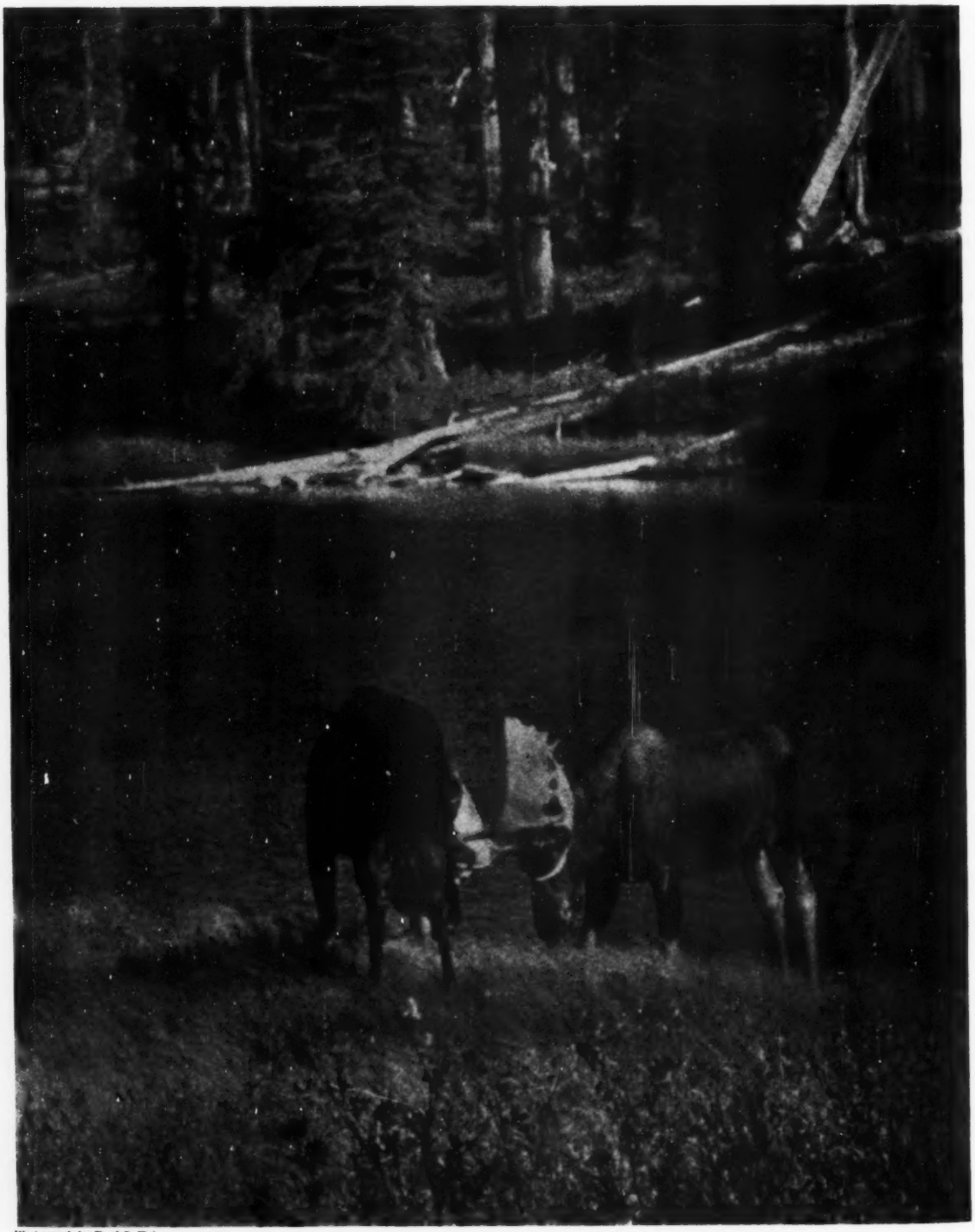
Photograph by Hobart Roberts

THE FOREST CREATURES SENSE THE CHANGING SEASONS



Photograph by J. F. Spanhorst

SUNLIGHT'S GOLD TOUCHES THE BEECHWOODS IN THE FALL



Photograph by Paul J. Fair

THE CHALLENGE — WHEN KINGS OF THE FOREST MEET

Photograph by John Kabel

WINTER'S FIRST COOL CARESS TOUCHES THE FALL WOODS

Photographs by the United States Forest Service

In the light soils of many of our western mountain ranges, it does not take long for such erosion as this—starting from pocket gopher workings in mountain meadows—to devour many acres of valuable farm and grazing land

THOMOMYS THE ENGINEER

By IRA N. GABRIELSON
Chief, United States Biological Survey

The Engineer himself — a pocket gopher with plenty of character

United States Biological Survey

OUT in Uncle Sam's 150,000,000-acre woodlot on the west quarter, the multitudinous members of an old established family of engineers are industriously digging away. Thomomys is the family name. The operations of this family, often causing loss of vegetative cover and soil erosion, seriously impair the future production of this great woodlot.

Just how does this happen, and why? First, examine Thomomys' equipment and the uses he puts it to.

Thomomys the engineer—widely nicknamed "pocket gopher"—never had the advantage of a college education, nor has he steam shovels, pneumatic drills, and other modern excavating equipment. Yet no college trained engineer ever drove a tunnel better suited to its particular purpose than can Thomomys with the equipment given him by Mother Nature.

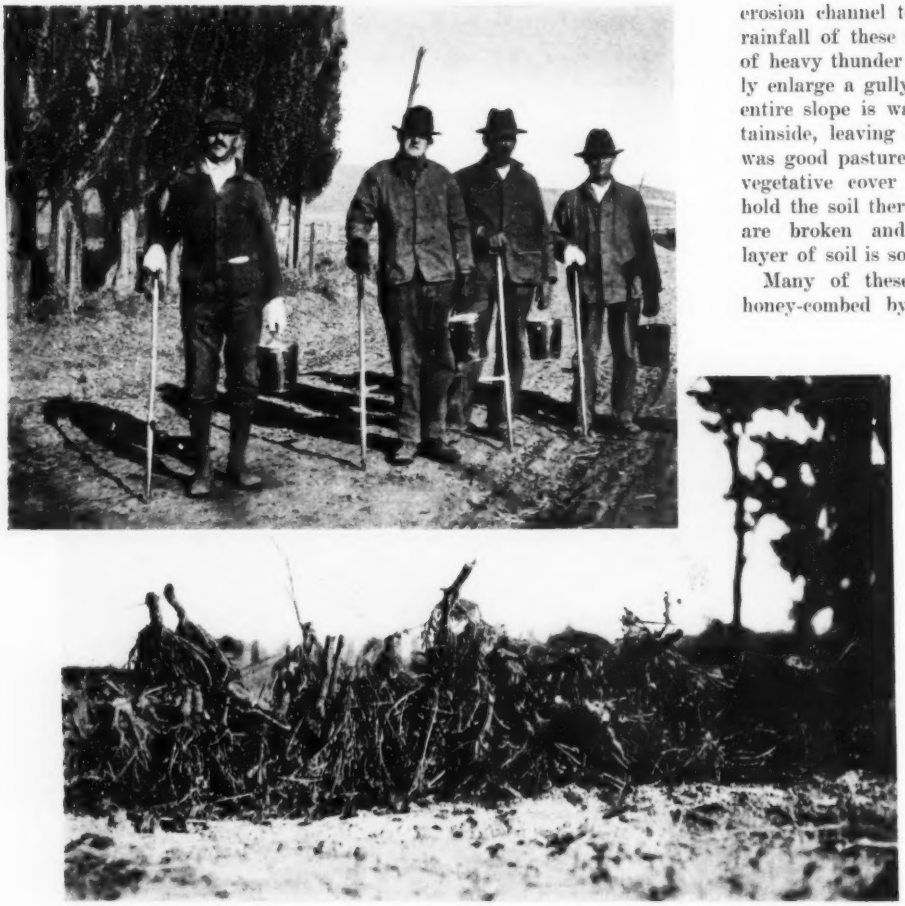
This equipment consists of a strong pair of forelegs, armed with stout, sharp claws, a keen sense of hearing and smell, a set of the most remarkable teeth on record, and an intense interest in digging tunnels. Those teeth cannot be passed up without further comment, for they are a major factor in making Thomomys one of the outstanding engineers of the animal world. The two front pairs of gnawing teeth are set into the skull at a peculiar angle and the lips are so arranged as to close from side to side behind them. With this arrangement Thomomys can use his teeth as picks in digging operations, and still keep his mouth shut, rather than fill it with dirt.

Still another accessory is a short, sensitive, almost naked tail which serves as a guide when it is necessary for this engineer to back pedal. Another very useful device is the ability Thomomys has of elongating his body until he is so long and thin that he can easily double back in his tunnel. It may be he learned this trick from the mole, which has it to a marked degree.

Thomomys is an individualist. He does not even believe in cooperation. He lives alone, works alone, eats alone, except during the mating season. He is a surly, ill-mannered, vile-tempered beast that would as soon pick a fight with a steam roller as someone his own size. He cares nothing for the opinions of man or beast, but builds his tunnels when and where it pleases him. Despite all of these anti-social characteristics I have, as a result of excavating many of his labyrinthine underground engineering jobs, developed a fondness for the industrious rascal.

It is his tunnel building trick and his feeding habits that bring him into disrepute with the human race. Thomomys is not at all careful where he puts his tunnels. He rather prefers to run one down a row of carrots, parsnips, potatoes, or what not, which some gardener foolishly thought belonged to him. An alfalfa patch is a delight to him, for it is filled with toothsome roots of generous size for him to gather, cut in convenient lengths, and store for future reference. The fact that the plant usually dies as a result of his attention disturbs him not at all.

That an irrigation ditch may break as a result of his digging activities, or that the water put on a piece of land may be led far astray as a result of following one of his tunnels, is no concern of his. He is accused, and sometimes with good reason, of both the direct and indirect destruction of thousands of acres of choice moun-



Alfalfa plants, showing how these little hard-working engineers eat the roots from the plants on which they feed and (above) a crew organized in eastern Oregon for gopher extermination work

tain meadows, valuable alike for livestock and game.

To my mind, this may be the most serious of all the crimes charged to Thomomys. Potatoes or carrots may be replaced, irrigation ditches can be repaired, mounds in alfalfa fields can be leveled, water seepage can be checked, but a mountain meadow or a grass covered hillside once ruined is gone forever, as far as the uses of mankind are concerned.

Look closely into what has happened and is happening today in the National Forests. These areas are one of the great economic assets of this nation. There are over 172,000,000 acres of forest, more than an acre each for every man, woman and child in this country. The welfare of this great body of public timberland, the greatest owned by any people on earth, is of vital interest to every citizen. Further, anything that directly or indirectly reduces its value for either present or future use concerns every citizen.

How can a tiny animal such as a pocket gopher affect the value of these timber lands? The answer is simple, and can be answered in one word—erosion. Trees cannot be grown where there is no soil, and there are areas in the western mountains absolutely denuded of soil as a result of pocket gopher activities.

Thomomys, in building his tunnels in the light soils of some of these mountains, often opens the way for an erosion channel to start. Much of the rainfall of these regions is in the form of heavy thunder showers, which quickly enlarge a gully once started, and the entire slope is washed down the mountainside, leaving bare rock where once was good pasture land. As long as the vegetative cover is present, its roots hold the soil there, but once these roots are broken and destroyed, the thin layer of soil is soon gone.

Many of these meadows become so honey-combed by the burrows of the little engineer that a man breaks through at every other step. So does a deer, an elk, a cow, or a sheep, perhaps hastening somewhat the erosion process, but one which was inevitable anyhow, because of the presence of Thomomys.

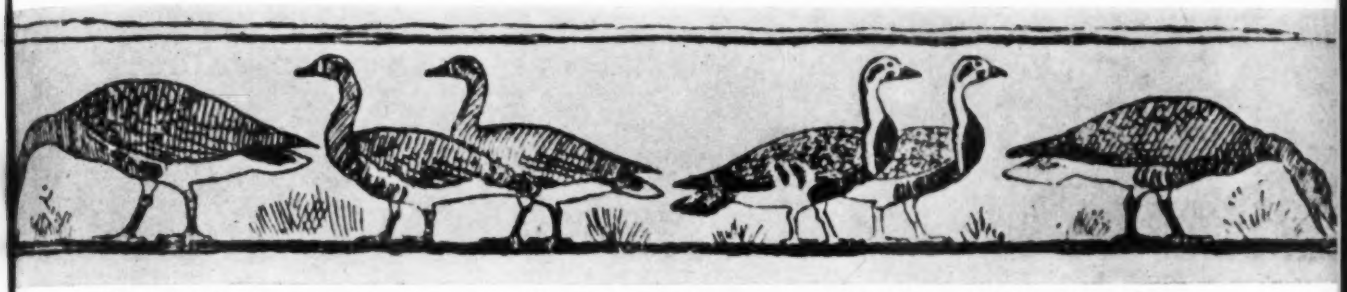
Can they be stopped? Most assuredly. Long years of experience in handling rodent problems in the western states have developed a marvelous technique. Pocket gophers could be removed from the best of these meadows for from twelve to sixteen cents an acre if funds were available. And funds will become available only when the public awakens to the need for such work.

Grazing in the open type pine forests is a great asset to livestock interests in adjacent districts. The stockmen throughout the West have no control over this land, but are given grazing permits each season. They have no proprietary interest in this grazing allotment, though the Forest Service will usually give them the same allotment each season as long as they handle it properly. Despite this lack of ownership of the land many stockmen realize so keenly the importance of removal of the too numerous rodents from the range that they often contribute in time and money much more than the Federal Government, which owns the land.

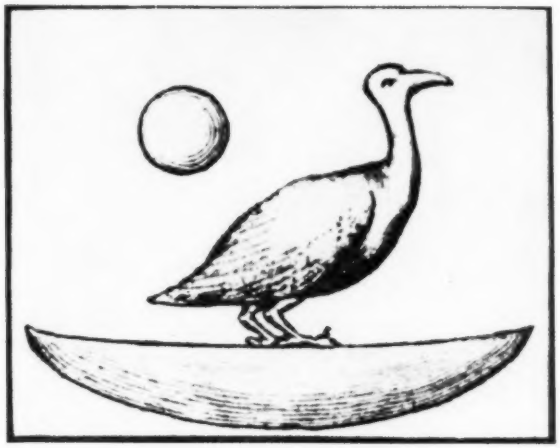
One needs only to learn the number of sheep and cattle grazed on these lands to understand their value to the American livestock industry. In 1936, 1,300,000 cattle and 5,700,000 sheep found summer feed in the western National Forests. This summer range makes possible the growing of alfalfa for winter feed in innumerable isolated valleys that could not possibly be successfully cultivated otherwise. In the same year around 6,000,000 acres were reported to be so badly infested with rodents that its grazing value was seriously affected. No wonder the (*Continuing on page* 478)

MAN'S BROTHERHOOD WITH THE WILD

By J. B. HARKIN



The earliest Egyptian concept of art is represented in this picture of geese — now in the Museum at Cairo. It came from the tomb of Ne fer maat at Medum and, — ascribed to the earliest dynasty, about 4400 B. C. — is universally known as "the oldest picture in the world"



The heavenly goose, believed by the ancient Egyptians to lay daily the egg which hatched into the sun

(From Bryant's "Analysis of Ancient Mythology")

MAN'S first rude attempts at art concerned the creatures of the wild because primitive man lived in the midst of the wild things. Animal life was closely interwoven with man's life, and that close intimacy for countless centuries established an extraordinary relationship which civilization has been progressively and steadily forgetting or ignoring. It was a relationship that meant vastly more to a man than a mere consideration of food and clothing, important as that may have been. We all know that Darwin in working out his theory of evolution did much to demonstrate that man's sense of duty, conscience, and the fundamental social virtues were derived to a very considerable extent from the social feelings which are innate in the lower animals as well as in man.

If modern science has given such recognition to the influence of wild life on mankind, it has but expressed in words what primitive mankind was always expressing in acts.

It appears that everywhere primitive man early began to feel that nature represented a vast agglomeration of animal tribes and clans, of which man himself was but a part. The strength of this conception naturally evolved into totemism. It is doubtful if in any part of the world primitive man did not develop the belief that between him and certain wild animals there existed an intimate and very special relationship. Various families or clans grew up which believed themselves to be of one blood with their totem, descendants of a common ancestor, bound together by common obligations to each other, and by a common faith in their totem.

We do not need to go beyond North America to see in the tribe and clan names among our Indians ample examples of totemism. For instance, the Turtle Clan of the Iroquois, Crayfish Clan of the Choctaws, Snake Clan of the Moquis of Arizona, the Elk Clan of the Omahas, the Crows, the Beavers, the Bears and the Eagles. It must be kept in mind that the connection between a man and his totem was considered to be mutually beneficent; the totem protecting the man in various ways, giving him signs and omens, and the man not killing or using for his food the animal which was his totem. If under stress of great hunger a man did kill his totem animal he uttered an expression of sorrow at doing so, and a plea for forgiveness. Thus we see a belief on Man's part in what might be termed a sort of supernatural character in animal life.

As man progressed he still preserved or perhaps accentuated this attitude towards animals, and we find him giving his gods animal forms. Further, we find him making animal sacrifices to various gods, surely significant of a belief that animals were a suitable medium for an approach to the Deity. In the middle of the second century, A.D., Celsus, a man of great learning and intelligence, gave vigorous expression to the idea that the world was created, not for man alone but for all living things.

An encyclopedia article paraphrases Celsus' attitude as follows:

"They are wrong in supposing that the world was made for man. Again it is the whole that is cared for. And we can see signs in Nature that animals are equal if not superior to man in many points. If he hunts the deer, the lion hunts him and feeds on him. Bees have cities and rulers. Some animals speak to each other. Some can foretell the future. Some are religious. In fact, neither for animals nor man was the universe made but that the world as God's work might be perfect in every part."

St. Francis of Assisi, preaching to the birds — from the painting by Giotto. It was this great saint of the Christian Church who in the 12th century, because of his great love for all animals, restored their status to that of the idea of universal brotherhood, held by primitive man

In this connection the viewpoint is almost universally accepted that the writings of Celsus expressed the attitude and opinion that had prevailed throughout the ancient world from the earliest days.

Thus primitive man and ancient man seem first subconsciously and later consciously to have taken the view that there existed a great brotherhood among all living creatures, and that the world was made for all of them, —not for man alone. Or perhaps as expressed by Celsus:

"In fact neither for animals nor for man was the universe made but that the world as God's work in every part might be perfect."

While the ancients seemed to admit without any qualifications that animals possess an intelligent soul like man's the Christian Church never accepted the view as such though St. Francis of Assisi (1182-1226 A.D.) restored animal life to a position akin to that of the universal brotherhood idea held by primitive man.

St. Francis is perhaps more famous in the world today for his attitude towards animal life than even as the founder of the great religious order, — the Franciscans. His love for animals of all kinds was one of his most remarkable and winning characteristics. He always spoke of the birds, the bees, the rabbits and domestic animals as his brothers and sisters. It is recorded that when the birds sang he said "Our sisters, the birds, are pleasing God." It is related of him "even wild wolves came like lambs and crouched at his feet."

The Countess Cesareseo, who in the 19th century became well-known as a friend of the wild things and of all dumb animals gathered and published some interesting material which indicated that in the middle ages there persisted a view as to animals having definite rights. As early as the 9th century formal trials of offending animals were held, in which at least an appearance of fairness to the animals was maintained. In such trials advocates were appointed to represent the animals, evidence and arguments submitted and formal judgments rendered.

The story of these animal trials as told by the Countess Cesareseo is highly interesting. The following extracts

© The American Museum of Natural History

The author's statement that man's first rude attempts at art concerned the creatures of the wild is illustrated by this beautiful painting by Charles R. Knight — his conception of Cro-Magnon men — artists of that early race at work in the Cavern of Font-de-gaume, at Dordogne, France

are taken from an article written by her, in "The Meaning of Modern Life":

"A good, characteristic instance began on September 5th, 1370. The young son of a Burgundian swineherd had been killed by three sows, which seemed to have feared an attack on one of their young ones. All members of the herd were arrested as accomplices, which was a serious matter to their owners, the inmates of a neighboring convent, as the animals, if convicted, would be burnt and their ashes buried. The prior pointed out that the three sows alone were guilty; surely the rest of the pigs ought to be acquitted. Justice did not move quickly in those times; it was on the 12th of September, 1379, that the Duke of Burgundy delivered judgment. Only the three guilty sows and one young pig (what had it done?) were to be executed; the others were set at liberty 'notwithstanding that they had seen the death of the boy without defending him' . . . . ."

"An important trial took place in Savoy in the year 1587. The accused was a certain fly. Two suitable advocates were assigned to the insects, who argued on their behalf that these creatures were created before man, and had been blessed by God who gave them the right to feed on grass, and for all these and other good reasons the flies were in their right when they occupied the vineyards of the Commune; they simply availed themselves of a legitimate privilege conforming to divine and natural law. The plaintiff retorted that the Bible and common sense showed animals to be created for the utility of man; hence they could not have the right to cause him loss, to which counsel for the insects replied that man had the right to command animals, no doubt, but not to

© The American Museum of Natural History

Neolithic Man — as portrayed by the art of Charles R. Knight — when the advance of civilization was marked by more and better implements of stone, bone and horn and wild animals were becoming domesticated for the use of man

The Bettman Archive

In the Middle Ages it was held that dumb animals had definite rights and responsibilities. Thus the fight at Montargis in 1371, during the reign of Charles V, — shown in this rare old print. In the execution of justice, the dog fights to the death a knight who had killed his master

persecute, excommunicate and interdict them when they were merely conforming to natural law 'which is eternal and immutable like the Divine.' The judges were so impressed with this pleading, that to cut the case short, which seemed to be going against him, the Mayor of St. Julien hastened to propose a compromise; he offered a piece of land where the flies might find a safe retreat and live out their days in peace and plenty. The offer was accepted. On June 29th, 1587, the citizens of St. Julien were bidden to the market square by ringing the church bells, and after a short discussion they ratified the agreement, which handed over a large piece of land to the exclusive use of the insects. Hope was expressed that they would be entirely satisfied with the bargain. A right of way across the land was indeed reserved, but no harm whatever was to be done to the flies on their own territory. It was stated in the formal contract that the reservation was ceded to the insects in perpetuity.

"All was going well, when it transpired that, in the meantime, the flies' advocates had paid a visit to that much-vaunted piece of land, and when they returned they raised the strongest objection to it on the score that it was arid, sterile and produced nothing. The Mayor's counsel disputed this. The land, he said, produced no end of nice small trees and bushes, the very thing for the nutrition of insects. The judges intervened by ordering a survey to find out the real truth, which survey cost three florins. There, alas the story ends, for the winding up of the affair is not to be found in the archives of St. Julien."

In the animal trials of the Middle Ages, of which, according to Countess Cesareseo, records of 144 have come to light, there was at least a recognition of animals having definite rights though apparently not any ardent desire to deal justly with such rights. Are we today any more just towards these rights? And why our attitude? Is it not because we have lost the old idea that the world was made for all living things and not for man alone? Is it not because we are denying the principle of brotherhood that early man so fully accepted?

The theory of evolution suggests there is no limit to the possibilities of development and advancement in this world. Surely that indicates that the loss of any of the materials man works with, such as dumb animal life, will retard and restriet his own development. Genesis says that when the wild things were reated God found them good. If He also gave man dominion over them that surely implied man's responsibility for preserving them to serve the ends of Man and Creation: in other words did it not imply the brotherhood idea of primitive man?

If man fails therein, what? I commend to all the oft quoted words of Thomas Jefferson:

"I tremble for my country when I think that God is just; that His justice cannot sleep forever; that considering numbers, nature and natural means only, a revolution of the wheel of fortune, an exchange of situation is among possible events; that it may become possible by supernatural interference. The Almighty has no attribute that can take sides with us in such a contest."

NATURE AT WORK

Clyde Martin, whose forestry experience ranges from India to the Pacific Northwest, where he is now forester for the Western Pine Association, told the State Foresters at their recent meeting in Boise that, according to the timber survey recently completed of all timber lands in eastern Washington, eastern Oregon and northern Idaho, natural reforestation is on its way. The inventory, he said, covered 30,000,000 acres, only 3.2 per cent of which nature is not now reforesting.

EDITORIAL

MEN, TREES, FARMS

LAST June some 1,200 young men graduated in forestry from the schools and colleges of the United States. In September a comparable number entered these schools to join the ranks of forestry students, and next June another graduating class may include a thousand or more fresh recruits to the profession. Many of last June's forestry graduates are without employment in their chosen profession—as are others of the previous classes. It is not enough to say, they are educated and should find work. The essential thing is that their services are needed and the nation should have the benefit of the work for which they are trained.

Employment in the Forest Service, the National Park Service, the Biological Survey, the Soil Conservation Service, the several state forest services, the supervisory responsibilities in the CCC, and other state and national agencies has drawn heavily on the forestry profession. Opportunities thus presented have encouraged many to study forestry. But all the forests are not owned or controlled by the federal or state governments. There are some 245,000,000 acres of commercially owned timber lands, and according to the most recent census, 185,000,000 acres of farm owned woodlands. It is to this latter group of lands that attention is directed. The products from these lands provided an income to some two and a half million farmers in 1935, the farm value of which was $190,000,000.

Unfortunately, the majority of these farm woodlands are poorly managed, and the income is scarcely a third of what can be expected with reasonable care and protection. The fault lies not wholly in having insufficient information, but in the lack of opportunity to transmit available information, leadership, and assistance to the woodland owners. With hundreds of foresters available, the difficulty boils down to a question of funds and authority to act.

Funds are actually lacking, but for over a year authority for a nation wide program has been on the statutes. The Norris-Doxey Cooperative Farm Forestry Act of May 18, 1937, gives broad powers to the Secretary of Agriculture to cooperate with the land grant colleges, universities, and state forestry agencies, "each within its respective field of activities" to cooperate with farmers in the care and improvement of their forest lands to the end that the products may be harvested, utilized and marketed so as to increase the farm-forest income. Authority is also given to aid in planting farm and other rural lands to trees and shrubs, and to conduct investigations such as will increase the efficiency of forestry when applied to farm lands.

To carry this out, annual appropriations of $2,500,000 are authorized, but nothing is available. When appropriations were considered during the last session of Congress, the opposition of various interests was too strong to overcome the natural inertia. The purposes of the Act were hopelessly confused with the Prairie States Forestry Project on which Congress had officially frowned. Added to this the commercial nurserymen vigorously presented their fears that authority to produce and distribute forest planting stock would be used to their detriment. Unfortunately, the possibilities for nation wide service to a large portion of the farmer owners was not sufficiently emphasized.

The new Act assumes, as stated by the Acting Secretary of Agriculture, that "encouragement and leadership in securing forestation of a large part of this tremendous acreage, spread over many states, is a logical federal function," and requires no comparable appropriations from the states. It offers unusual opportunities for extension foresters, occupying their field of education and demonstration, to advise and lead the farmers to a fuller appreciation of the values existing in their woodlands and the opportunities which await them and their children when idle portions of their farms are planted to forest trees. They may go so far as to encourage the organization of groups of owners for cooperative forestry purposes.

Accompanying and following the laying of this ground work of education, the State Foresters and their staffs could render a large service in furnishing technical assistance, extending effective forest protection, and assuming responsibility for the formulation and application of woodland working plans.

Such a program could lead toward the creation of many Regional or District Foresters available to carry out the service and protective features of the State Foresters' programs. Developed to even a portion of its full possibilities it would give employment to more than a thousand men, and in the course of a few years could reach many of the 185,000,000 acres now classified as farm woods. It would add to farm income, improve the stability of farm ownership, and make definite contributions to the program of soil conservation.

Like the Fulmer Act of August 29, 1935, the Cooperative Farm Forestry Act of May 18, 1937, needs the motivating power of regular appropriations to be effective. Always attentive to the agricultural needs of the country, Congress would give ear to requests for appropriations if its members could visualize the benefits awaiting the administration of this act for the farm woodlands of the country. In these days of social and economic experimentation, the venture has features of great promise, and should be started.

STATE FORESTERS OPEN C

STATE FORESTERS from the four corners of the country gathered at Boise, Idaho, on August 29, for the nineteenth annual meeting of the Association of State Foresters. Augmented by more than a hundred representatives of federal conservation bureaus and forest industries, the meeting was one of the largest in the history of the Association.

After holding open and executive sessions for two days in Boise, the convention moved by automobile cavalcade up the beautiful Payette Valley to Payette Lake, thence over a wilderness road through the Payette and Sawtooth National Forests to Sun Valley, Idaho—famous mountain resort of the Union Pacific Railroad—where the State Foresters were accorded a hearing by the Joint Committee of the Senate and House, appointed at the last session of Congress to study the forest situation of the United States. During the course of this trip, the foresters were guests of the Southern Idaho Timber Protective Association—the oldest organization of its kind in the United States—at a barbecue luncheon on the North Fork of the Payette River, and were given a trip to the Packer John Lookout, widely known as a model fire detection development.

The hearing at Sun Valley marked the initial meeting of the Congressional Committee and although only two members—Senator Pope of Idaho and Representative Doxey of Mississippi—were present, it provided the State Foresters an opportunity to present their recommendations for the development of a balanced national forest program. Their outstanding recommendations to the Committee were:

(1) That the Federal Government more fully meet its public obligations in helping the states and private forest landowners to stop forest destruction caused by forest fires, forest insects and tree diseases. They recommended specifically that the authorization for cooperative forest protection under the Clarke-McNary Act be increased to $9,000,000 and that the authorization for insect and tree diseases be increased to $1,000,000.

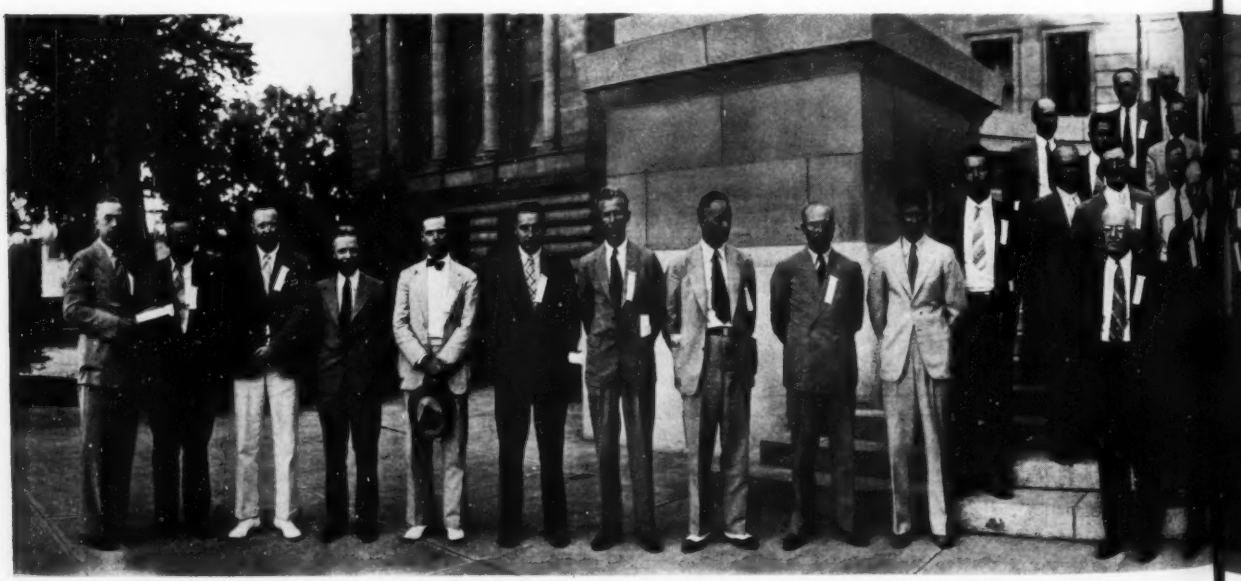
(2) That Congress appropriate the full amount authorized by the Fulmer Act; namely, $5,000,000, in order to aid the states in the creation of state forests. This act was passed by Congress two years ago for the express purpose of promoting the creation of state forests but no appropriation has yet been forthcoming.

(3) That Congress provide the full authorization of $2,500,000 contemplated by the Norris-Doxey Act to help the states meet their problems of promoting and developing forest practice on farm woodlands.

Interest in what stand, if any, the State Foresters would take in respect to the controversial issue of public regulation of private forest properties was answered by passage of the following resolution:

"WHEREAS, there are indications of impending action leading toward federal forest regulation as evidenced by public statements of United States Forest Service officials; and whereas, there is a wide variety of land use problems in all states and parts of states; therefore, be it resolved by the Association of State Foresters in convention assembled that if and when forest regulation measures are enacted they should be state-wide, prepared within and by the states and that these measures should be written into state law, one by one, only as they have been proven practicable by actual trial."

In giving the Congressional Committee a picture of state forestry today and the problems with which it is confronted, regional presentations were made after a brief introductory statement by the president of the As-



State foresters and representatives of other forest interests who attended the nineteenth annual meeting of the Association of State Foresters, held at Boise, Idaho, last month. More than forty states are represented in the above group. Cooperative forestry and for-

CONGRESSIONAL HEARINGS

sociation, Fred C. Pederson, of Virginia. Speaking for the Pacific Coast states, T. S. Goodyear, State Forester of Washington, told the Committee the major problems confronting the Pacific Coast states are: (a) a preponderance of federally owned and controlled forest lands that have increased the tax burden of private forest lands almost to the point of confiscation; (b) a negligible area of state owned and administered forests; (c) insufficient funds to adequately protect state and private lands from fire.

Pointing out that over sixty-five per cent of the forest land in the states of California, Oregon, Washington, Idaho and Montana is now in public ownership, Mr. Goodyear declared that further forest land acquisition by the Federal Government should stop until the government devises a suitable method of reimbursing the counties for loss of tax income on lands in government ownership.

"Within the five states of this region," he said, "private owners have approximately $9,000,000,000 invested in timber with another estimated $725,000,000 invested in logging roads, equipment, sawmills and other woodworking plants. Against standing timber alone the annual tax bill to private owners is about $12,500,000. In addition, forest fire protection is costing the states and private landowners about $2,000,000 annually. The direct annual contribution by the government for forest fire protection on private and state lands is $400,000."

He called attention to the fact that approximately seventy-five per cent of the fires in the region are caused by the public in pursuit of recreation and that the government should provide its fair share of the cost of protecting state and private lands against the fire hazard. Concluding his statement, he said that the Pacific Coast states individually and collectively recommend a retarded federal land acquisition program, based upon equitable contributions to the counties for loss of taxes on government land; congressional appropriation of the full amount of $5,000,000 authorized by the Fulmer Act to promote state forests; and amendment of the Clarke-McNary Act to permit the Federal Government to meet up to half the cost of adequate forest protection. This would amount to $9,000,000 for the country as a whole.

The presentation for the southern states was made by Frank Heyward, Jr., State Forester of Georgia. In a brief discussion of the place of forestry in the South, Mr. Heyward portrayed the social and economic situations resulting in part from lack of management of forest properties and the part that proper forest management could play in the rehabilitation of vast areas of land and millions of people within the lower income groups. Forestry was stressed as a new industry made necessary by a changing agricultural program which has already increased unemployment. "One pulp mill in Louisiana," said Mr. Heyward, by way of illustrating how forestry over broad areas in the South could take up the slack of unemployment, "is employing as much labor in mill and woods as would be required to grow and harvest 100,000 acres of cotton."

Citing the best figures available on the raw wood supply in the South, Mr. Heyward pointed out that while there is a deficit between annual growth and annual cut of slightly over a million feet in saw timber sizes, that deficit could be turned into a surplus by the elimination of timber losses due to fires.

Considerable emphasis was placed on the increased interest in forestry in the South illustrated by increased forestry activities of local (*Continuing on page* 472)

est protection were the key subjects of discussion. The convention was the occasion for the first meeting of the Joint Congressional Committee, appointed by the last Congress to study forest questions of national import and to recommend legislation for their solution

TIMBER CONNECTORS--

Small Giants Which Are Holding Old and Opening New Markets to Lumber

By VAN BEUREN W. DE VRIES

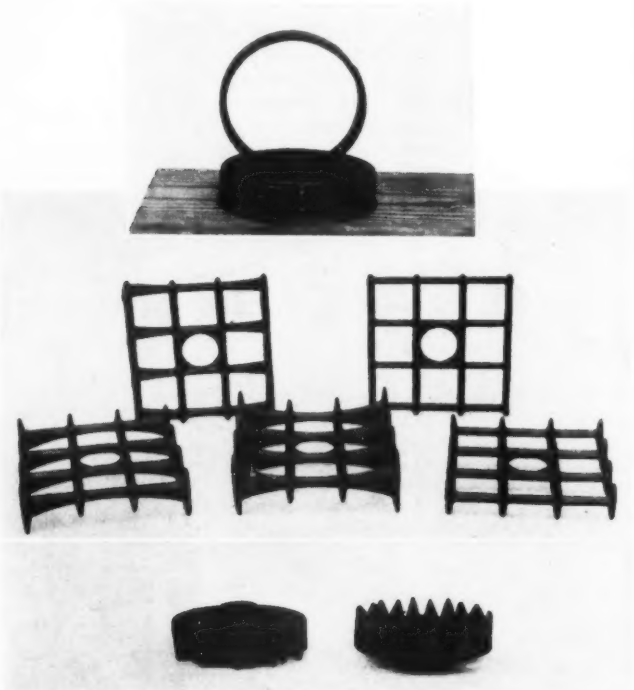
Erected at Lufkin, Texas, this creosoted wooden lookout tower was built with Teco connectors

FOR more than a quarter century every analysis of wood utilization has been punctuated by numerous markets lost to lumber. The finding of new uses and new markets for forest products has very definitely fallen behind the rate at which lumber has been losing its application. The advent of the steel building, followed by intensive promotion, had by 1930 practically completed the elimination of lumber as a heavy construction material. In fact, the universal use of steel has been extended far beyond the marginal limits of uses where steel is actually superior to wood.

The paragraph above represents the picture of five years ago. Today the picture has been repainted, and the repainting process offers an interesting key to what can be accomplished for the benefit not only of the forest industries but of industry in general, through bringing back into its rightful position a material often neglected because its voice may not reach above the clamor of more articulate competitors.

More timber has been used in the last five years for "engineering construction" than in the fifteen years previous; and more new types of structures have employed timber as a structural material than at any previous period in sawmill history.

In 1932 a group of far-seeing lumbermen, cognizant of the fact that certain European engineers, whose access to steel is more remote than American engineers, had developed some interesting new design principles for timber engineering, brought to the United States patents for the revolutionary "timber connector" which, while small in itself, has been responsible for this one bright spot in wood utilization. The Timber Engineering Company, a lumber-industry-owned company, was organized to market and to apply to American construction the timber connector, which improves the standing of timber as a heavy construction material about one hundred per cent and makes possible its utilization in fields hitherto



Above is shown the Teco split ring timber connector. In the center are three types of spike grid connectors, — (1) single curve grid for use between pile and sawn brace; (2) double curve grid for use between two piles, and (3) plain grid for use between two sawn faces.
Below — a shear plate, another type of the Teco connectors which have rejuvenated wood utilization markets

thought exclusive to steel. Timber connectors, now called TECO connectors, have been responsible in the last four and one-half years for the utilization of more than 344,000,000 feet of lumber, valued at $6,685,000. The devices themselves are simple metal appliances employed to develop full joint strength in timber structures. They strike directly at the former weakness in heavy timber construction—the joint between timbers—and by increasing the strength of joints to the full strength of the timber member itself, have practically revolutionized and established a new set of engineering principles for timber.

The connectors fit either into grooves in the contacting faces of over-lapped wood members to be joined, or bite into the members with sharp teeth. The timbers are then held in place with the customary bolt. This arrangement places the joint tension on the metal connector, which spreads the load over the entire surface area of the timbers involved rather than localizing the pressure around the edge of the bolt, with consequent crushing of fibers and loss of strength. The strength of joints can thus be greatly increased.

Formerly, timber structures designed for bolt connections required over-sized members to provide sufficient bulk around the joints. Now, with a joint as strong as the timber itself, excess material can be eliminated. From thirty to forty per cent of the wood formerly required to carry a load can now be saved. No longer are the complicated systems of dapping and expensive steel gusset plates necessary.

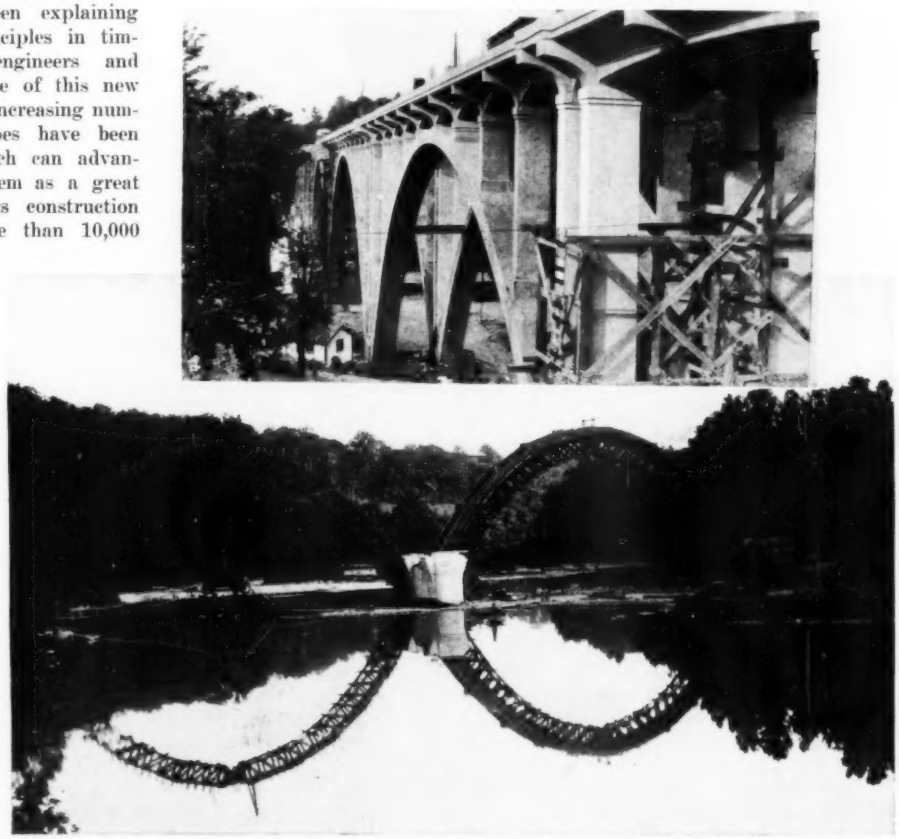
For five years the Timber Engineering Company has been explaining these new design principles in timber utilization to engineers and builders. As knowledge of this new system has spread an increasing number of structural types have been added to the list which can advantageously use the system as a great economy over previous construction methods. In the more than 10,000 structures now existing in the United States which have used the connector system may be found bridges, fire lookout towers, roof trusses, oil derricks, schools, railroad trestles, distillery racks, C.C.C. buildings, grandstands, dry docks, armories, poster panels, orchestra shells, loading docks and radio towers. Moreover, the potential market for timber connector built structures has hardly been scratched.

In the field of forest fire lookout tower construction this one innovation was responsible for the building of 115 timber towers out of a possible 118 erected during the past year. All towers were let on bids by the United States Forest Service and the Biological Survey. Of real significance is the fact that three years ago all towers for these government agencies were constructed of steel.

Connectors have played an important part in creating adequate framing for highway bridges. As long as there are roads, and as rapidly as transportation facilities improve and new roads are built, there will be a necessity for bridge construction. This branch of the building industry offers a vast market for utilization of wood, and with the advent of connector-framed members bridge designers and engineers are turning more and more to wooden structures.

Outstanding examples of bridge construction units employing the timber connector principle are a highway suspension bridge over the Rogue River in the Siskiyou National Forest in Oregon. The bridge span was 344 feet long. Approximately 106,000 board feet of lumber was used. A timber trestle over Albemarle Sound in North Carolina is three and one-half miles in length, while a bridge over Little Miami River, at Foster, Ohio, is 1,310 feet in length. Six timber falsework arches, having a span of from 155 to 175 feet, were required in its construction. About 90,000 board feet of lumber was used.

There is also the sixty-foot Multnomah County Highway Bridge in Oregon, about (*Continuing on page* 466)



The beautiful concrete arches of the bridge over the Little Miami River at Foster, Ohio, are shown above while below are the timber falsework arches. This bridge is 1,310 feet long and the arch spans are 155 to 175 feet; 90,000 board feet of lumber was used in the arch centering only

BIGLEAF MAPLE

***Acer macrophyllum* Pursh**

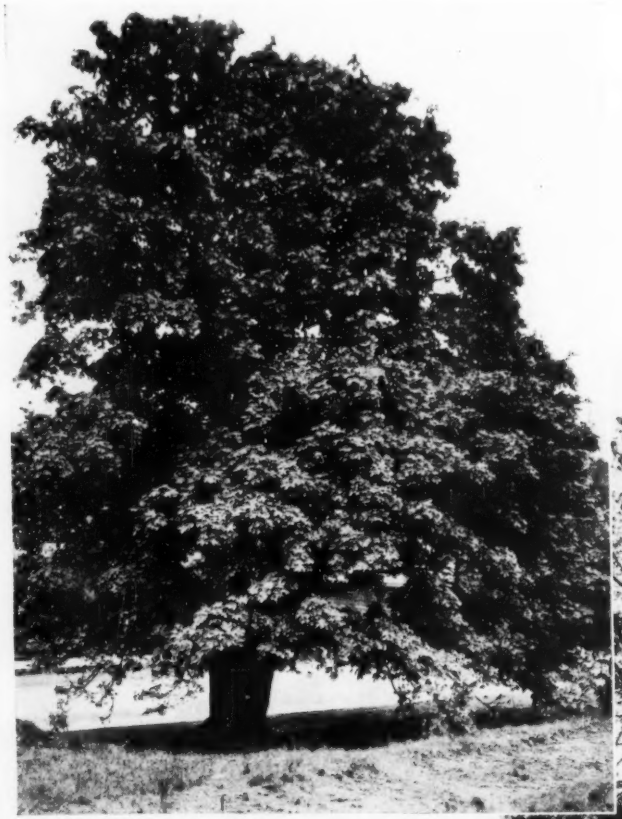
BY G. H. COLLINGWOOD

EXTENDING some twenty degrees of latitude along the Pacific Coast from Alaska to southern California, bigleaf maple is the sole commercial species of four western maples. Demanding moisture, it occurs along the borders of foothills and on low mountains from sea level to elevations of over 3,000 feet in Washington and Oregon, and in California to 6,000 feet.

In the open this maple develops a broad, rounded crown of dense, blue-green foliage and a short trunk. Such trees may be fifty to sixty feet, or occasionally seventy-five feet high, with trunk diameters of two, three, or rarely five feet at breast height. Forest grown trees reach heights of 100 feet with a full, straight bole, clear of branches for one-half to two-thirds the total height and supporting a short, narrow crown. Best growth is in moist, gravelly, rich soils in alluvial river bottoms of Oregon and Washington. Sometimes found in pure stands, it is usually in mixture with conifers and other broadleaf trees.

In dense forests, mosses, lichens, and ferns drape the limbs well into the crown, which may help cause its poor form. It seldom lives longer than 150 or 200 years. The simple, opposite leaves are the largest of any American maple, being six to twelve inches long and slightly broader, which accounts for the name—*macrophyllum*. They are usually deeply cut into five wavy or sub-divided lobes. The leaves vary in size on the same tree, and on trees of different ages, but are always conspicuously large as compared with those of other maples. Deep green and shiny above, and a paler green beneath, they are deciduous. In autumn the clear green of summer becomes a golden yellow, and the leaves hang on into the winter. No other native maple flowers compare with the four to six inch drooping clusters of fragrant yellow blossoms which deck the entire tree in April and May, after the leaves are fully formed. Both sexes are found on the same tree.

The winged samaras or keys are larger than those of other maples, and the seed is covered with short, stiff hairs. They are one and a half to two inches long, tawny or yellowish brown, ripen in the autumn, and hang on into the winter or early spring. Open grown trees produce abundant quantities of seed nearly every year, but production in the dense forest is sporadic. A large proportion germinate,



Open grown bigleaf maples have broad, dense, round-topped crowns with short trunks. Leaves and fruit frequently hang on into the winter

George C. Stephenson

but only seedlings whose roots reach mineral soil before dry weather sets in survive. They will live under dense shade, but to attain any size direct overhead light is required. Supplementing reproduction by seeds are fast growing coppice sprouts from stumps. The ashy to brownish gray bark is seldom more than half an inch thick, and is broken into rough, fairly broad ridges as the tree matures.

The wood is light brown with a pale tint of red—firm, fine grained, takes a high polish, and a cubic foot weighs about thirty-four pounds when air dry. In 1936 the forests of Washington and Oregon produced 8,770,000 board feet of maple lumber. Furniture takes the bulk, but considerable quantities go into interior finish, flooring, broom handles, saddles, pulleys, boats, boxes, and baskets. Curly or wavy wood is occasionally found, and fancy grained burls command high prices for furniture veneer and novelties.

Bigleaf maple is reasonably resistant to insect attack and as part of the understory of humid forests seldom suffers from wind or fire. When fire occurs, however, the thin bark offers little resistance. Wood destroying fungi often reduce the trunk of large trees to scarcely more than a shell. Well suited for ornamental purposes within its natural range, it is a favorite street tree in many western towns. This tree does not prosper under our eastern conditions, but grows well in parts of England and western Europe.

Largest of all American maples are the deeply divided leaves. The wings of the fruit may be two inches long

The ashy gray to reddish brown bark is thin and deeply furrowed

George C. Stephenson

Large, yellow, fragrant flowers hang in clusters four to six inches long

Natural range of bigleaf maple

A PARADISE FOR SPORTSMEN

(*Continued from page* 447)

time in 1936, the fishing season did not open until 1937. Then, from the first day on, it was evident that, despite its great size, Pymatuning Lake will not prove too great for the enthusiasm of Pennsylvania, Ohio and visiting sportsmen. In many sections, fishermen were standing shoulder to shoulder for hundreds of yards at a stretch. A great many also fished from boats. The lake was heavily stocked with black bass, pike, yellow perch, sunfish and other species by the Pennsylvania and Ohio Fish Commissions.

Although considerable debate arose over the use of motor boats on the lake, conservationists succeeded in preventing such action. The explosive exhausts of such craft will not only frighten waterfowl and drive them from the area, but the wash from the propellers and the wasted oil from the motors are detrimental to fish life and to the aquatic vegetation essential to both fish and waterfowl. No oil wastes will ever contaminate the fish and plant life, nor the waterfowl, of Pymatuning Lake.

To the north of the Pymatuning lies another area of land and water which, though much smaller, is separated from the main lake by both rail and highway. This area contains 2,500 acres of water and 1,200 acres of land and has been set aside by the Pennsylvania Game Commission as an inviolate refuge for the propagation of wild waterfowl and upland game.

The area has been extensively planted to aquatic foods to attract migratory birds. Much planting of mixed grains also has been done on the land portions of the area in order to attract and increase pheasants, quail, rabbits, raccoons, and other game birds and animals. In the spring and fall of the year countless thousands of ducks on their annual trip north and south rest and feed on the lands and waters in this delightful haven. Many of them even stay to nest.

For some reason or other this refuge, although never stocked with any kind of fish life, has become a regular breeding ground for carp, and the spillway is a veritable boiling pot of writhing fish.

Not long ago a mallard duck with her young were in the spillway and the little ducklings vied with the fish for bread that was tossed in the water. So powerful and so great in number were the little carp that, in their greed to acquire the food, they raised from six inches to a foot above the water level, forming a platform over which the little ducklings walked.

There is something fascinating about Pymatuning. It is only forty miles south of Lake Erie, and but a few miles from Conneaut Lake, another of Pennsylvania's famous summer resorts. It has an atmosphere not unlike the ocean and the many interesting things to be seen there make it one of the greatest recreational centers, not only in Pennsylvania, but in the eastern United States.

TIMBER CONNECTORS

(*Continued from page* 463)

which the bridge engineer said: "Actual cost figures show that we saved one-third on lumber, one-half on hardware, and one-half on labor by using ring connectors."

Connector-built roof trusses are being used extensively in connection with the government low-cost housing and slum clearance projects. This type of roof truss makes possible the maximum use of local labor and local materials. Engineers and architects find timber-connector trusses strong, rigid, time-saving and economical. In one instance a crew of two carpenters and two laborers turned out twenty-five trusses an eight-hour day, completing 3,000 trusses in all.

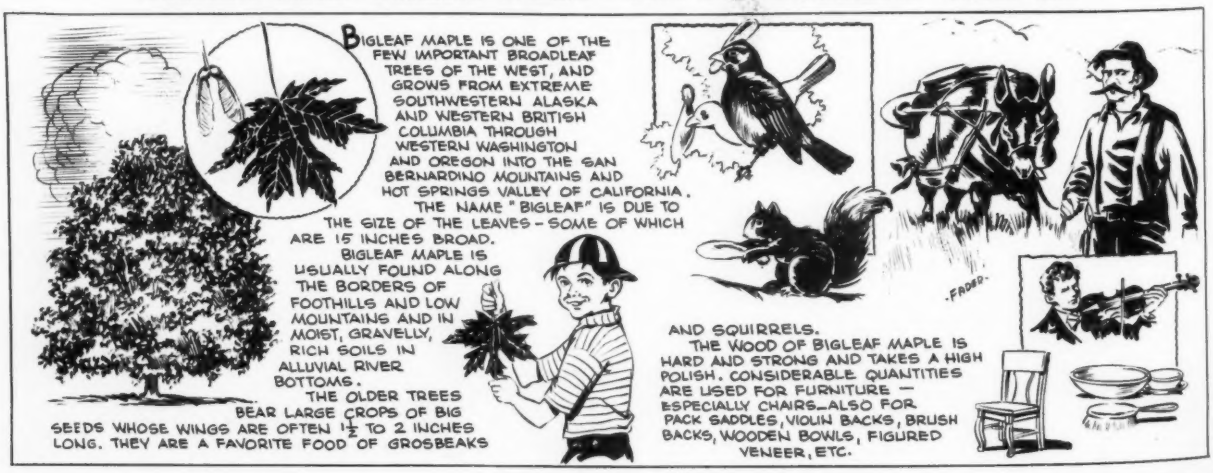
A few of the Federal Housing projects that used connector timber trusses are: Smithfield Court, Birmingham, Alabama; Fairfield Courts Housing Project, Stamford, Connecticut; Old Harbor Village, South Boston, Massachusetts; La Salle Place Housing Project, Louisville, Kentucky; Bluegrass and Aspendale Park, Lexington, Kentucky; Lauderdale Courts, Memphis, Tennessee, and Cheatham Place Housing, Nashville, Tennessee.

While the greatest demand for wood comes from the home building and housing interests, other constant users of this renewable resource, since the inception of connector construction, have been the shipping industry and city dock commissions. This latter group, with its building and remodeling of vessels, drydocks and warehouses, was responsible for one of the largest wood employing projects in 1937. This was the building of a warehouse and timber dock and the enlargement and improvement of a quay dock at Portland, Oregon—calling for approximately 3,500,000 board feet of lumber.

Another unusual structure built with wood last year was a ski jump, erected for the Central United States Ski Association annual competition at Soldiers Field, Chicago. This was the tallest free standing ski jump built in the United States, rising 180 feet at its highest point. It used 71,000 board feet of lumber, with connectors applied at all joint connections.

These examples illustrate how the wood market has been widened due to timber connector development. Their application is practically limitless and, with research and improvement continuously underway, the field for this system of construction is opening up rapidly.

TREES AND THEIR USES—No. 36—BIGLEAF MAPLE


BIGLEAF MAPLE IS ONE OF THE FEW IMPORTANT BROADLEAF TREES OF THE WEST, AND GROWS FROM EXTREME SOUTHWESTERN ALASKA AND WESTERN BRITISH COLUMBIA THROUGH WESTERN WASHINGTON AND OREGON INTO THE SAN BERNARDINO MOUNTAINS AND HOT SPRINGS VALLEY OF CALIFORNIA. THE NAME "BIGLEAF" IS DUE TO THE SIZE OF THE LEAVES - SOME OF WHICH ARE 15 INCHES BROAD.
BIGLEAF MAPLE IS USUALLY FOUND ALONG THE BORDERS OF FOOTHILLS AND LOW MOUNTAINS AND IN MOIST, GRAVELLY, RICH SOILS IN ALLUVIAL RIVER BOTTOMS.
THE OLDER TREES BEAR LARGE CROPS OF BIG SEEDS WHOSE WINGS ARE OFTEN 1½ TO 2 INCHES LONG. THEY ARE A FAVORITE FOOD OF GROSBEAKS AND SQUIRRELS.
THE WOOD OF BIGLEAF MAPLE IS HARD AND STRONG AND TAKES A HIGH POLISH. CONSIDERABLE QUANTITIES ARE USED FOR FURNITURE — ESPECIALLY CHAIRS—ALSO FOR PACK SADDLES, VIOLIN BACKS, BRUSH BACKS, WOODEN BOWLS, FIGURED VENEER, ETC.
FRASER

The powerful International TD-40 Diesel TracTracTor clearing land in northern Louisiana.

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WHEN SALMON MEET BONNEVILLE DAM

(*Continued from page* 444)

fish ladder or the fish locks. This collecting system is eighteen feed wide, has forty-one entrances nine feet wide, and is supplied with 2,400 cubic feet of water a second.

The fish ladders from the main channel have been in operation since February, 1938. Since May, observers stationed at the ladders have counted the various fish using them. During May, June, July, and 29 days of August the reports were as follows:

	Chinook	Blueback	Steelhead	Silver
May	24,972	1,035	6,639	
June	8,222	17,722	2,381	
July	6,544	72,563	28,395	
August (29 days)	22,164	25,505	2,034	251
	Total	190,653		

A heavy run of Chinook salmon and steelhead trout may be expected in September, after which the migration will diminish rapidly.

Almost all these fish entered the ladders from the main channel of the river, but as neither of the two turbines was in continuous operation there has been little current in the tail race to attract them into this channel, and few ascended the ladder leading from it. Accordingly, there has been no opportunity to test the effectiveness of the power house collecting system.

In addition to salmon some 400,000 other fish, such as suckers, squawfish, chubs, carp, lampreys, whitefish, shad, and trout have gone up the ladders.

Supplementing the fish ladders, three pairs of fish locks have been built into the dam, which operate after the manner of a ship lock. These may be useful either as accessories to the ladders, or when the ladders are out of use. At the time of writing they are still in experimental operation, and no conclusion regarding their ultimate effectiveness is justified.

Observers at the dam are convinced that the upstream migrants are not accumulating in the river below the dam, but are passing through the fishways without much delay. During a period in the autumn of 1937 all fishways were closed. Large numbers of salmon accumulated in the quiet water below the dam and displayed themselves in leaping. When temporary fish ladders were installed 100,000 fish, almost the entire horde, went through in a single day. Since the permanent fish ladders have been in operation there have been several occasions to lower the water level above the dam until the flow down the ladders was insufficient to attract fish. Each time fish ceased to ascend and accumulated below the dam. When the ladders were again operated large numbers of fish traversed them for one or two days, and thereafter few were seen below the dam.

Even so, the number of fish which will pass the dam during this year, if they

continue to go over at the rate they have been, seems insufficient to maintain their numbers in the river.

The reported catch of salmon and steelhead in the Columbia River for 1935 was 23,344,800 pounds. Using an approximate average weight of each kind to calculate the number of each species taken, the following numbers were obtained:

Chinook salmon	700,755
Chum salmon	101,300
Silver salmon	883,966
Blueback salmon	10,446
Steelhead trout	218,512
Total	1,914,979

The catches of succeeding years have not been greatly different, but most of them were made below Bonneville, with only a small portion from above. Assuming that half these fish were hatched below Bonneville, which, in view of the heavy pollution of the Willamette, is improbable, nearly a million of the catch were spawned above. Now arises a question no one can answer definitely—what proportion of the total migration is represented by the number caught? It is well known that the chances of survival of a fish from the egg to its own period of reproduction are few. Even though a female salmon may deposit 3,000 to 4,000 eggs, only enough adults survive to keep the number of the species approximately the same over any considerable period of time. All tracing of marked young salmon show only a small proportion captured as adults. If overactive fishing is added to the other adverse circumstances of a salmon's life, the number in any run will inevitably be reduced. Even since 1915 the catch of salmon in the Columbia River has been reduced by a half.

Salmon, like all species, have a great excess of reproduction which is controlled by natural enemies. Man appears to be the enemy which most effectively prevents any excess in their numbers. What proportion of a run is excess, and what part is absolutely necessary for the perpetuation of the species, are long debated questions. The observation now being made at Bonneville may furnish answers, at least for the local situation, but present figures indicate that only 450,000 to 500,000 salmon and steelhead will pass through the Bonneville fish ladders this year. Even then the dangers to which the migrants are exposed are not ended when passage over the dam has been accomplished. Chief danger is the commercial fishing above Bonneville. In 1935 approximately 133,000 and in 1936, 212,000 salmon and steelhead were taken above Bonneville. It therefore is possible that half or two-thirds of these fish which pass the dam may be captured, and the needed reproduction of a million or more fish in the upper river will depend upon the comparatively small number which finally arrive at the spawning grounds.

Fears that the current in the forty-mile river-lake above the dam would not be sufficient to direct the fish to the upper end of the backwater are apparently without adequate basis. Here the river flows through a gorge and has not been greatly widened by raising its level. Therefore, except at low water a considerable current exists and in places it is swift. Data collected this summer indicate that salmon swim from Bonneville to Celilo, ten miles beyond the head of the lake, in three to eight days.

The permanent change of level in the backwater area may, however, greatly reduce the production of the organisms on which fingerlings feed. Consequently a doubt persists, which experience of the next two years may resolve, as to the ability of fingerlings to find necessary food while passing down this stretch to the river.

Several other questions have been raised as to the effect the dam may have on the downstream migration of the fingerlings. It is believed that fingerlings generally remain near the margins of the stream. Those which swim along the banks in shallow water will safely pass the dam through the fish ladders and various available by-passes. Those which go down the main channel can pass safely through the spillway gates, but fingerlings which go down the south channel may be drawn into the turbine tubes. Experiments and tests with other turbines indicate that few fish can pass through and live. Certainly, the injury of an appreciable percentage of the young fish in this manner will affect the runs of the salmon.

Concern which has been expressed regarding the possible destruction of adult steelhead ascending the river to spawn a second time, by the turbines, has been answered by a recent study showing that only a small proportion of Columbia River steelhead spawn more than once.

While many questions remain unanswered, it is apparent that if this year's count of salmon migrating upstream to spawn beyond Bonneville is representative of the run at that point, immediate steps must be taken to give greater protection to the fish above the dam. Without doubt, the number of fish upon which the maintenance of the species now depends is too small to bear much interference without serious results.

CHESAPEAKE AND OHIO CANAL TO FORM NATIONAL RECREATION AREA

Purchase of the right-of-way of the century-old Chesapeake and Ohio Canal, which extends 185 miles from Georgetown in Washington, D. C., to Cumberland, Maryland, to serve as a federal recreation area is now fully assured, according to recent announcements from the Department of the Interior. The work of restoring and adjusting the old canal, with its locks and other appurtenances, so that it may be suitable for public recreation, will be handled as a Public Works project under the direction of the National Park Service. Later, under existing authority, or possibly as a result of special legislation, the property will probably be turned over to the National Park Service for administration.

The majority of the stocks and bonds of the old canal company are owned by the Baltimore and Ohio Railroad, who have pledged them to the Reconstruction Finance Corporation as part collateral for a loan. Recently, the Public Works Administration is reported to have received a check for $2,000,000 from the RFC with which to defray the cost of acquiring the land. The money is reported to have come from the sale of PWA bonds.

District of Columbia courts approved the contract on September 13 after Maryland courts had taken similar action. Completion of all legal details is expected in time so that title to the 185 miles of right-of-way will be vested in the United States by January 1, 1939. At that time it is understood an additional $500,000 will be made available to the National Park Service for improving the canal and for establishing recreation areas in the lower twenty-two miles between Georgetown and Seneca, Maryland.

These plans, according to officials of the National Park Service, contemplate the restoration of the locks, lock keeper houses, and the tow-path as far up the Potomac River as Seneca, Maryland. There is possibility that this may include the restoration of an old hotel at Great Falls, the development of the tow-path for the use of cyclists, provision of boating facilities, and the creation of a black bass fishing preserve.

The canal as it now exists is the continuation of a project which was encouraged by George Washington. The first shovel of dirt of the canal as financed by the old "Potowmack Company" was taken out by President John Quincy Adams on Independence Day, 1828. During the subsequent years it went through several reorganizations, and enjoyed its greatest period of prosperity during the World War, when large quantities of coal were transported on it.

With the canal company property there will come into the possession of the government all the records still existing of the original Potowmack Company, formed by George Washington and his associates, who first projected the idea of an inland waterway to open up the fertile farm and mining lands of the Cumberland. Washington headed this company before becoming President of the United States, relinquishing his post for that purpose. Many of these historic records are in Washington's handwriting and bear his signature.

RAYMOND H. TORREY

Raymond H. Torrey, Secretary of the Association for the Protection of the Adirondacks, died at his home in New York City on July 16—his fifty-eighth birthday. Long associated with organizations for the protection of natural resources and for the encouragement of outdoor recreation, he was one of the board of managers of the Appalachian Trail Conference. In this capacity he helped develop the Appalachian Trail, which extends for 2,050 miles along the mountain crest from Maine to Georgia. He was also chairman of the New York-New Jersey Trail Conference, and at various times had served as secretary for the New York State Council of Parks, the National Conference on State Parks, and the American Scenic and Historic Preservation Society. At the time of his death he was a member of the Board of Managers of the New York Botanical Garden, and President of the Torrey Botanical Club. The latter was named in honor of a distant relative, the early American botanist, John Torrey.

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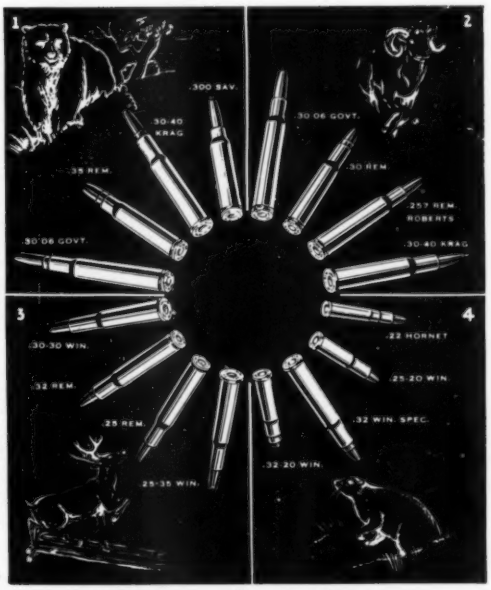
3. Deer—elk—mountain lion—black bear—seal—jaguar. Any of above cartridges are effective. We also suggest .32 Rem. 165 gr. "Express" Mushroom; .25 Rem. 87 gr. "Hi-Speed" Mushroom; .30-30 Win. 170 gr. soft point. Other favorites for deer include .303 Savage, .25-35 Win., .45-70 Gov't., .32-40 Win., 44-40 Win.

4. Woodchuck—bobcat—coyotes—wolves—.32 Spec. Win. 165 gr. "Express" Mushroom; .25-20 60 gr. "Hi-Speed" Mushroom; .32-20 100 gr. soft pt.; and .22 Hornet .45 gr. "Hi-Speed" Mushroom. Modern Remington c. f. cartridges have Kleanbore priming, non-fouling jackets, brass cases. Oil-Proof sealing. Write for cartridge guide.



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AROUND THE STATES

NEW JERSEY'S FOREST PLANTING EXPANDS

New Jersey State forest nurseries shipped 1,452,550 trees to forest planters during the past spring, and by sowing approximately 600 pounds of tree seed prepared for a production of approximately 3,500,000 in 1940. Of the total number of trees distributed, 445,700 were planted on state forests and state parks, 438,900 by farmers and private land owners, 273,000 by water companies, and 188,000 by cities, counties, and state institutions. Schools, colleges, industries, and various organizations took the remainder.

GRAND TETON ENLARGEMENT CONSIDERED

Proposals to enlarge the Grand Teton National Park in Wyoming by transferring some 221,610 acres from within the Teton National Forest and adjoining lands in public and private ownership were considered by Senator Joseph C. O'Mahoney's subcommittee of the Senate Committee on Public Lands and Surveys, held in Jackson Hole, Wyoming, during the week of August 8, 1938. Other members meeting with Senator O'Mahoney were Senators Schwartz of Wyoming, Reames of Oregon, Andrews of Florida, Hitchcock of South Dakota, and Pittman of Nevada, together with Representative Paul Greever of Wyoming. Director Arno B. Cammerer and George L. Collins represented the National Park Service, Regional Forester R. H. Rutledge and Assistant Regional Forester C. J. Olsen, the Forest Service, and Milward Simpson, an attorney from Cody, Wyoming, represented ranchers, county, town and school authorities, many of whom are reported to oppose the proposal for enlargement. The report will be made early in the next Congress.

COLORADO STATE FOREST

Following successful consummation of the largest single exchange of lands ever attempted in the West, the Colorado State Board of Land Commissioners will assume jurisdiction of the first Colorado state forest on November 1, 1938. The terms under which the Forest Service has arranged provide for the acceptance of title to 70,826 acres offered by the State of Colorado in exchange for the 70,881 acres of National Forest lands in the North Park region, north and east of Walden, Colorado. This area in northwestern Colorado is now a part of the Routt National Forest and was selected because the state already owns about 15,000 acres in the vicinity, and because of its proximity to the Colorado State College at Fort Collins, where it is easily accessible as a training ground for forestry students at the college.

The area is regarded as exceptionally good timber-producing land and is estimated to contain nearly 67 million feet of merchantable timber. Included in the tract also is considerable grazing land.

The exchange is effected under authority of state legislation enacted in 1931 which provided for the establishment of the Colorado State Forest.

"The policy that will be followed by the state," according to Arthur H. King, Register of the State Land Board, "is to administer this forest in accordance with the recommendation of the State Forester, so far as timber cutting and protection are concerned, and it is contemplated to work out a thirty-year rotation plan of marketing of matured timber and reforestation of denuded lands."

"So far as possible," his statement continued, "the grazing privileges will be leased to adjoining land owners who have been using the forest in the past, taking into account the amount of winter feed produced and with the general idea of not upsetting the economical ranch units as they now exist."

A permanent camp for the use of forestry students from the State Agricultural College and for 4-H Clubs is now being established.

CCC CONTINUES PLANTING TREES

The planting of 50,000,000 forest tree seedlings on 50,000 acres of unproductive public forest lands this fall has been approved by James J. McEntee, Acting Director of the Civilian Conservation Corps. Most of the trees will be planted in National Forest areas and the balance in state forests.

Completion of the fall planting program will bring the total number of trees planted during 1938 by the CCC for reforestation and erosion control to approximately 275,000,000. Of this number about 100,000,000 have been or will be planted by enrollees on erosion control projects where the work is supervised by the Soil Conservation Service. The U. S. Forest Service of the Department of Agriculture supervises all tree planting on public forest lands.

Spring planting was carried on in virtually all sections of the country, but fall planting will be largely confined to the Lake States, Montana, northern Idaho, the Pacific Northwest, and certain regions of California. The largest number of trees to be planted this fall will be in the Lake States, where 33,000,000 seedlings were established a year ago.

The approved annual output of the Forest Service tree nurseries is now more than 170,000,000 tree seedlings. Weather and other local conditions influence the actual yearly output, however, which Forest Service technicians estimate will, this year, be in the neighborhood of 160,000,000.

The R. Y. Stuart Nursery in Louisiana and the W. W. Ashe Nursery in Mississippi, with approved yearly outputs of 26,000,000 and 25,000,000 tree seedlings, are the largest. Trees supplied by these nurseries provide for reforestation programs being carried on by the CCC in the southern pine forest regions.

The Chittenden and the Wyman nurseries, in Michigan, are each capable of producing approximately 14,500,000 trees annually. Largest of the western nurseries is the Savenac at Haugen, Montana, with an output of 10,000,000 small trees.

BRIDGE FOR APPALACHIAN TRAIL

The construction of a 200 foot, cable-suspended foot bridge at Sourdnahunk Falls, over the West Branch of the Penobscot River in Maine is reported as an outstanding CCC accomplishment in the perfection of the 2,050 mile Appalachian Trail from Mount Katahdin to Georgia. Several small foot bridges were also constructed over minor streams, and CCC forces have constructed some two dozen Adirondack-type shelters at various points in the State.

In New Hampshire, CCC enrollees encamped in the White Mountain National Forest have brushed out the trail and a number of rock cairns were placed for the guidance of hikers. The tread has also been improved, corduroy has been laid in wet places and a few log-stringer, rustic foot bridges have been built.

In Vermont, where some twenty-six miles pass through the Green Mountain National Forest, five open-front Adirondack shelters have been constructed and one foot bridge built.

Cooperating with the Pennsylvania State Department of Forests and Waters, first class shelters have been built where drinking water is available. Each shelter includes a fireplace, bunks, and toilet. A bridge has also been placed near Old Forge.

Little has been done on the trail in Maryland, outside of some incidental work on South Mountain above Boonsboro, but since 1933, the CCC has completed the maintenance of some forty-two miles of the trail in the George Washington National Forest from Rockfish Gap east of Waynesboro to Rocky Row Run on the James River near Snowden. Construction of one or two Adirondack shelters is planned on this portion of the trail.

Still farther south in Virginia, twenty-six miles of the trail passes through the Jefferson National Forest, and other National Forests and Park land are traversed in North Carolina and Tennessee before it ends at Mount Oglethorpe, Georgia. CCC maintenance includes some sixty miles passing through the Pisgah National Forest in North Carolina, ninety-three miles on the Cherokee National Forest, in Tennessee, and about 100 miles along the Blue Ridge in Georgia. Work has been started on several Adirondack shelters in the Cherokee National Forest, and on various cabins, and sources of water in the Chattahoochee National Forest in Georgia.

FORESTER KILLED IN COLLISION

Lincoln Crowell, extension forester in Massachusetts, was killed when his car was struck by a train at a railroad crossing in East Brewster, Massachusetts.

Located on Cape Cod as an extension forester for many years, Crowell's experience in forestry work goes back for thirty years. He was a graduate of the class of 1907 of the Yale Forest School and upon graduation entered the United States Forest Service. Assigned to the regional office at Ogden, Utah, he had charge of planting work in that region during the early days of the Forest Service. Crowell left the Forest Service to engage in state forestry work and later became extension forester for the Massachusetts State Conservation Commission.

BOARD NAMES COMMITTEE ON ELECTIONS

The Board of Directors of The American Forestry Association has named S. B. Detwiler of the District of Columbia, Philip W. Ayres of New Hampshire and Fred C. Pederson of Virginia as the 1939 Committee on Elections to nominate candidates for officers of the Association for the ensuing year. The officers to be elected include the president, treasurer, twenty-one vice-presidents and three directors.

Suggestions by the membership of officers to be nominated will be welcomed by the committee. Direct nominations may be made by the membership provided the nominations are signed by not less than twenty-five members. All suggestions and nominations should be addressed to the Committee on Elections at the main office of the Association and must be received by the committee on or before November 1. S. B. Detwiler is Chairman of the Committee on Elections. The slate nominated by the committee, together with any candidates nominated by the membership, will be submitted to the members of the Association for letter ballot on December 1.

LAKE ISOM BECOMES WATERFOWL SANCTUARY

Lake Isom, with 1,521 acres adjoining Reelfoot Lake in Lake and Obion Counties, Tennessee, has been added to the chain of waterfowl sanctuaries maintained along the Mississippi flyway by the Biological Survey, by recent executive order of President Roosevelt.

The new sanctuary, while not as large as other refuges along the Mississippi flyway, is in a section where large numbers of wild ducks and geese feed and rest during their annual migrations, and has been heavily hunted for waterfowl.

The variety of bird life includes a large colony of American egrets that breeds on Reelfoot Lake and uses Lake Isom as a feeding ground, together with little blue, great blue, and green herons, wood ibises, killdeers, double-crested cormorants, solitary sandpipers, and anhingas or water turkeys. Other waterfowl using the area are wood ducks, American widgeons, ring-necked ducks, mallards, pintails, blue and green-winged teal, lesser scaups, shovelers, and canvasbacks.

Lake Isom, once a part of Reelfoot Lake, was formed about 1812 as a result of an earthquake. Reelfoot Lake, which drains a large section of southwestern Kentucky and northwestern Tennessee, empties into Lake Isom through a spillway in the highway connecting Tiptonville and Union City. A drainage ditch through the bed of Lake Isom was deepened several years ago, but the land remained too wet to raise farm crops on the south end of the lake bed. Thereafter, the area became heavily wooded, and the lands were acquired by the Farm Security Administration. Plans for maintaining constant water levels by constructing dikes and water-control structures and otherwise improving the area are being made by the Biological Survey.

SETH GORDON HONORED

Completion of twenty-five years of service in behalf of wildlife by Seth Gordon, Executive Secretary of the Pennsylvania Game Commission, was recently celebrated by his staff at Harrisburg, when he was presented with a hand etched water service set.

Beginning his career with the Pennsylvania Game Commission in 1913, Mr. Gordon succeeded the late Dr. Joseph Kalbfus as Executive Secretary in 1919 and continued in that capacity until 1926. Thereafter, for five years he was Conservation Director of the Izaak Walton League of America with offices in Chicago, and in 1931 he became President of the American Game Association. Later, under Gordon's leadership, that organization was absorbed by the American Wildlife Institute, and on December 31, 1935, he resigned to realign himself with the administration of wildlife in Pennsylvania.

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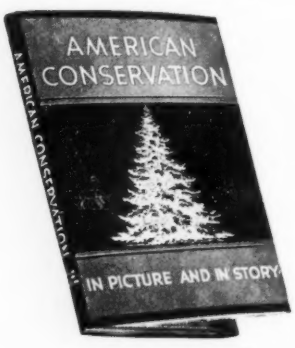

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STATE FORESTERS OPEN CONGRESSIONAL HEARINGS

(*Continued from page* 461)

owners and the influx of northern capital into the South for the purchasing of southern forest lands. Private tree plantings, according to Mr. Heyward, increased from 7,239 acres in 1931 to 54,617 acres in 1936, with trees available in Georgia and South Carolina alone in 1938 to plant over 65,000 acres. Increase of areas placed under cooperative forest fire protection from 36,800,000 acres in 1926 to over 74,000,000 acres in 1938 was also cited as an indication of increased interest of landowners, as was the increase in state appropriations for forestry from $226,000 in 1926 to over $1,182,000 in 1938.

Comparison was made with federal and state annual appropriations for fire control with a state and private increase between 1932 and 1938 of over $635,000 annually and a federal increase of only $37,000. Mr. Heyward set forth a nine point program of problems and solutions:

(1) Control of forest fires throughout the South. To this end, it was recommended that Clarke-McNary funds be increased to $9,000,000 annually.

(2) Acceptance of greater responsibility by industry for improved woods practices. "Failure of industry to recognize this responsibility," Mr. Heyward said, "may have to be met with other measures, but until industry shows indications of failure to continue its present increasing interest and willingness to accept responsibility for more improved woods practices such measures should not be necessary." Recent studies in the South, he said, show private owners leaving lands in good growing condition on 17,145,000 acres; in fair condition on 10,652,000 and in unsatisfactory condition on 5,163,000 acres. The study covered thirty per cent of woodlands exclusive of farm woodlots in eleven southern states.

(3) Reforestation of all lands that will not reseed naturally was recommended through an extension of the present program and appropriations under the Norris-Doxey Act of $2,500,000 and the McNary bill presented to Congress by the State Foresters.

(4) Forest taxation and tax delinquency including fear of future taxes were cited as problems of state forestry calling for federal assistance in the study of local problems and their solutions.

(5) The existence of tax delinquent and submarginal land areas not attractive to private capital was cited as a problem which might be reduced by fire control and better cutting practices but for which acquisition by state and federal governments was recommended.

(6) The possibilities of increasing forest practices by assisting landowners willing to forego immediate profit for future gain was suggested by way of a system of forest credits on a long term low interest basis.

(7) Insects and diseases were cited as another major problem for which intensified research and federal aid in the application of the findings of such research were recommended.

(8) The eighth major problem was listed as public apathy in respect to forest resources for which an intensified and dramatized educational program on a scale commensurate with the values involved was recommended.

(9) Poor woods practices by landowners was cited as the ninth problem. As a solution, the State Foresters recommended increased activities under the Clarke-McNary and Norris-Doxey Acts and passage of the McNary bill sponsored by the State Foresters.

In making the report the southern State Foresters pointed out that ninety-five per cent of the forest lands of the South are in private ownership and a large part of it attractive to private capital as contrasted with conditions in the Pacific Northwest where federal holdings predominate and much is unattractive to private capital.

After reviewing the importance and problems of state foresters in the northeastern states, William G. Howard, State Forester of New York, speaking for the region, listed the major forest problems of these states as:

(1) Unemployment caused by decline of the textile industry in New England—a situation that could be met by forest management and reestablishment of permanent wood-using industries.

(2) Shortage of locally grown sawtimber which increases the cost of local lumber.

(3) Lack of forest management adequate to bring about sustained yield of forest products and to maintain permanent forest industries, protect watersheds, or provide needed public recreation.

(4) Inability to provide means of reforesting millions of acres of lands submarginal for agriculture.

(5) Insufficient funds to carry on needed education and extension programs to teach forest owners how to handle their forest lands.

(6) Insufficient funds with which to protect forests from fire, insects and disease.

(7) Lack of equitable systems of forest taxation to reduce the pressure exerted on the forest owner to cut his timber before it is economically mature.

(8) Needed improvements in small sawmills to enable them to compete with the output of the larger mills.

Mr. Howard told the Committee that the Federal Government could help the states meet these and other forest problems (1) by providing more adequate cooperation in the protection of forests from fire, insects and disease; (2) by providing the federal aid authorized by the Fulmer Act for the creation of state forests; (3) by increasing federal aid to the states for the production of forest

(*Continuing on page* 476)

PENNSYLVANIA TREES FOR SOIL CONSERVATION

Approximately six and a half million of the 17,000,000 forest tree seedlings and transplants are available for fall and spring shipments in Pennsylvania State nurseries, and have been allotted to the Federal Soil Conservation Service for planting in Pennsylvania in soil erosion work.

The inventory, according to Secretary James F. Bogardus, of the Department of Forests and Waters, shows that more than 53,600,000 trees are being cultivated in the state nurseries for future shipment.

NATIONAL FORESTS INCOME EQUALS $4,608,853

Net receipts of $4,608,853 yielded by the 158 National Forests during the fiscal year ending June 30, 1938, were $327,000 less than for the fiscal year 1937 but were $545,000 more than for the fiscal year 1936.

Thirty-five per cent of the net receipts from the National Forests is returned to the local communities. Twenty-five per cent of the returns go directly to the various states to be expended as the state directs for the benefit of public schools and public roads of the county or counties in which the National Forest is situated. An additional ten per cent is appropriated for expenditure by the Forest Service for construction and maintenance of roads and trails in the National Forests in the states from which the income is derived.

Timber sales yielded $2,435,000 during the year ending June 30, 1938, with the largest returns—$663,000—coming from National Forests of Washington and Oregon. Region Eight, including National Forests from the Carolinas to Texas, returned $408,000.

Next to timber sales, the largest returns from National Forest lands came from grazing. Grazing permit fees totaled $1,636,000, of which $959,000 was obtained from grazing cattle and horses and nearly $677,000 from grazing sheep and goats. Nearly seven million animals use the National Forest ranges every year and the returns from grazing fees during the past year showed an increase of $64,000 over that of the year 1937.

The third largest source of income came from special use permits issued by the Forest Service for such private uses as summer homes, hotels, resorts, dude ranches, boat liveries, stone quarries, ferries, bark gathering and fur farms. The income from various special uses was $364,000, although no charge is made for such public uses as municipal welfare camps and schools.

MUIR WOODS ROAD AUTHORIZED

Auxiliary highway legislation authorizing the expenditure of $25,000 from National Park Service highway funds, to be matched by a like sum from the State of California, for construction of a highway to the redwoods of the Muir Woods National Monument near San Francisco, has been signed by President Roosevelt.

WISCONSIN OFFERS WRITING COURSE

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The Bartlett Service of Stamford, Connecticut, extending from Maine to the Carolinas, is described in an attractive and well illustrated booklet entitled "Green Gold." Using the slogan "America's trees are worth saving," the booklet tells of the tree and landscape service of the Bartlett Tree Expert Company whose work records extend back more than twenty-five years. In addition to the photographs of beautiful estates whose trees have been served by the men of this firm, several pages are devoted to famous and historic trees of the northeast.

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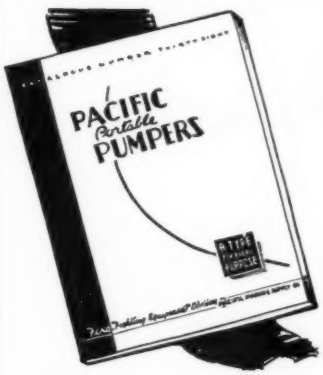

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BOOKS

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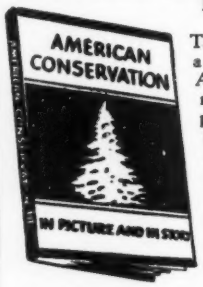
AMERICAN CONSERVATION
By Ovid Butler



This volume presents a clear picture of America's organic natural resources, the part they have played in the development of the nation, the manner and consequences of their use, and the spread of the conservation movement from its beginning in the United States down to the present time. **144 pages. Price $2.50.**

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NEW BOOKS

JOHN OF THE MOUNTAINS (Unpublished Journals of John Muir). Edited by Linnie Marsh Wolfe. Published by Houghton Mifflin Company, Boston, Massachusetts. 458 pages. Illustrated. Price $3.75.

A fitting and noble work has been done by the editor in giving to the world this collection of heretofore unpublished memoirs of John Muir—naturalist, scientist, and writer—in this centenary year of his birth. This group of sixty journals, written over a period of forty-four years (1867-1911), covers nearly the whole of his career as a naturalist.

Here is an intimate glimpse into the life of one of America's greatest pioneers, whose rich philosophy flowed as gently as a crystalline stream in the cool, fresh verdure of the deep woods. His impressions of the wild country which he loved are filled with mellow beauty and warmth, and from his early records as a herder of sheep down through the years when, as one of the country's foremost conservation leaders, he helped secure the enactment of legislation resulting in the establishment of national parks and forest reserve systems in this country, one may glean an intimate understanding of his life and thoughts. Seeking no adulation, no recompense for his many achievements, John Muir sought only to bring to an unawakened public something of the glory of nature and the great need of conserving and preserving for future generations the vast wealth of our natural resources.

This newest edition of John Muir's writings is more than a literary achievement—it is a monument to the memory of a great man.—D. D.

SOILLESS GROWTH OF PLANTS: USE OF NUTRIENT SOLUTIONS, WATER, SAND, CINDER, ETC., by Carleton Ellis and Miller W. Swaney. 155 pages. Illustrated. Published by the Reinhold Publishing Corporation, New York. Price $2.75.

Starting with the premise that "since the roots of plants are capable of absorbing and assimilating only food that is in solution, that is, dissolved in water, it matters not whether soil or man furnishes the food," the authors of "Soilless Growth of Plants" have presented a highly technical subject with clarity and simplicity suitable to any intelligent lay reader.

Known as "hydroponics," aquaculture, water-culture, tray agriculture, or tank farming, this little book promises to meet a popular demand which has been stimulated by numerous articles and by widespread discussion. The authors, who are associated with the Ellis Laboratories of Montclair, New Jersey, have supplemented information gathered through personal experience and research with the results of studies made by several of the state experiment stations and by commercial enterprises.

With specific data and the generous use of illustrations three forms of soilless growth are described—water culture, sand-culture, and sub-irrigation systems. Supplementing this is a chapter on "Special Chemicals" and another presenting eight "Nutrient Formulas."

Lest the reader be carried away with unfounded enthusiasm or misled by unprincipled salesmen, the authors warn that the growing of plants by soilless agriculture "requires time and attention, just as soil-grown plants do, and, in addition, common sense." Furthermore, "chemicals or no chemicals, plants will require sunlight (or its equivalent) in order to grow."

The information and examples are drawn from such a variety of sources, and described so simply, as to be useful to amateurs and householders as well as to commercial growers.—G. H. C.

WINGS, FUR AND SHOT, by Robert B. Vale. Published by Stackpole Sons, New York and Harrisburg, Pennsylvania. Illustrated by George M. Sutton. 199 pages. Price $4.

For the serious hunter — rich man or recreationist — of birds, big and small game, Bob Vale has put together what must remain for some time to come an authentic *vade-me-cum* for American sportsmen: what, as he subtitles his handbook, is truly "A Grass-roots Guide to American Hunting."

As Seth Gordon — long-time conservationist and sportsman — points out, in his foreword to Vale's graphically illustrated book, it is "really different."

"Written by an old newspaperman-sportsman who for years has used his typewriter to help improve the lot of the outdoorsman, it is a modest and refreshing work. It is not fiction. Neither is it a boorish recitation of shooting triumphs, nor a boresome attempt to annex angelic virtues which few hunters of an older generation could honestly claim."

In simple, entertaining language, Vale eliminates all fluff and feathers except as they pertain to the game at hand to be flushed and brought to gun. No man, with some forty years' shooting experience to draw upon, could be expected to write without reflecting his preferences and prejudices — for certain species, for pet ideas of the proper way to enjoy the sport of hunting them. Where Vale errs, if anywhere, in these fields, is in not swatting hard enough, those methods which he — and the rest of us — believe are unsportsmanlike.

Sensibly and quietly, he explains how to look for rabbits, how to shoot them when found; how to flush pheasants — ringnecks, Reeves, Hungarian, and guinea fowl — and the use of the dog; how to "walk down a grouse"; cook in camp; train a hunting dog; how, when, and if one should use waterfowl decoys. He believes that hunting is a test of a man's character, and presents a patient chapter to prove it; furnishes some speculative prose on the peculiarities of guides and

their unerring discernment of fourflushers.

It is perhaps possible to call "Wings, Fur and Shot" a humane book, wherein is included a practical study of wildlife habits, conservation and other sensible matters, designed to make hunting a greater sport, and less a slaughter.—D. B.

TIMBER PRODUCTS AND INDUSTRIES, by Nelson Courtlandt Brown. Published by John Wiley and Sons, Inc., 440 Fourth Avenue, New York City. 316 pages. Illustrated. Price, $3.50.

A factual presentation covering the conversion of standing timber to useful, merchantable forms is presented in Professor Brown's "Timber Products and Industries." Special emphasis is given to the enormous wastage in all forms of forest manufacture. Within its chapters one finds discussed the entire field of forest industry from the production of logs, lumber, and cross ties to excelsior and bark. The pulp and paper industry is given considerable emphasis, and the chapters proceed through productions of naval stores, tannin, charcoal, with the various derivatives of wood distillation, and even to the more homely products of fuel wood, fence posts, staves, nuts, and maple syrup.

It is primarily a text book and carries a wealth of information which has been assembled from a great variety of sources.—G. H. C.

YOUTH SERVING ORGANIZATIONS. Published by the American Youth Commission, Washington, D. C.

"To consider all the needs of American youth between the ages of 12 and 25, and to ascertain by investigation of the agencies concerned with the care and education of youth how effectively these needs are being served" is one of the several purposes of the American Youth Commission of The American Council on Education, — a non-governmental group devoted to the study of the problems of youth. This is a preliminary report, presenting valuable basic data on a large number of national organizations whose activities are concerned wholly or in substantial part with American youth. Including much information never assembled before, it is believed that this book will be of great use to community leaders everywhere interested in the problems of today involving the care and education of youth.—L. M. C.

PORTFOLIO ON THE NATIONAL PARK AND MONUMENT SYSTEM. Issued by the American Planning and Civic Association, 901 Union Trust Building, Washington, D. C. In four parts, 75c complete, postpaid.

This pictorial work has high interest and informative value. Part I answers completely the question so often asked—"What are the National Parks?" Part II is called "The Conservation of Nature" and deals with wilderness conservation—of rocks, trees and animals. Part III, titled "The Preservation of History," covers just that, giving a brief cross-section of the fascinating historic and prehistoric exhibits of our National Parks and Monuments, while Part IV, called "The Master Plan," explains the plan of park development, both existing and proposed, its second section being devoted to an exposition of the many facilities and fine services provided by Park operators to meet the needs of Park visitors. Each of the four parts is complete in itself, presenting sixteen pages of striking pictures, beautifully printed, and each has a heavy black paper cover imprinted with a special design printed in bold color. The Portfolio is a distinctive piece of work and has been, most appropriately, dedicated to the late Stephen T. Mather, who was the first Director of the National Park Service.—L. M. C.

WE, TOO, ARE THE PEOPLE, by Louise V. Armstrong. Little Brown and Company, Boston, 1938. 474 pp. Price, $3.00.

This is a warm-hearted human book of enthralling interest, an important bit of contemporary history telling the story of three years of Federal Emergency Relief Administration in a northern Michigan county. It gives a vivid picture of the economic and social devastation that followed in the wake of old time lumbering in Michigan and suggests the slow and difficult rehabilitation that is the only hope for such regions. To those of us who realize that conservation is a matter of human as well as natural resources, it is a fascinating and valuable book.—H. G. B.

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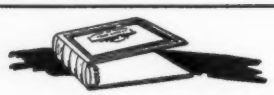

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ASK THE FORESTER

Forestry Questions Submitted to The American Forestry Association, 919 - 17th St., N. W., Washington, D. C., Will Be Answered in This Column. . . . A Self-Addressed Stamped Envelope Should Accompany Your Letter.

QUESTION: Will you please advise me the correct way to season lumber made from American holly?—R. T. G., Alabama.

ANSWER: Assuming that no dry kiln is available and that the stock must be air dried, special care must be given to protect the cut lumber from sun, rain, and wind to reduce season checks. Such checks can be further avoided by coating the ends with hot paraffin or filled hardened gloss oil. The boards should be piled on a firm level base and as open as possible to permit free circulation of air. Each tier of boards should be separated with narrow pieces of well seasoned wood. After several weeks of air drying, the stock should be further dried in a heated room before it is made into furniture.

QUESTION: What is the meaning of the word Shenandoah?—E. G., Washington, D. C.

ANSWER: Shenandoah derives from an Iroquois Indian word—Schindhandowi—which in translation means "the stream passing by."

QUESTION: I am interested in wildlife, and would like to obtain an education that would qualify me to make a living as a wildlife expert. Are there any schools or colleges where such courses are available?—J. M., Maryland.

ANSWER: Many colleges now recognize wildlife as a major study. The necessary education to qualify one as a wildlife expert may be obtained at the following colleges which offer Master degrees in wildlife management: The University of Maine, Connecticut Agricultural College, Texas Agricultural and Mechanical College, Utah State Agricultural College, and the Alabama Polytechnic Institute. The University of Wisconsin, among others, also offers a degree in wildlife management.

QUESTION: Are any trees or plants either resistant to, or unpalatable to the Japanese beetle?—W. L. G., Virginia.

ANSWER: Although nearly 300 species of non-evergreen trees, shrubs, and flowers are eaten by the adult beetle with varying degrees of preference, it appears that the coniferous evergreens as a group are more or less immune. Others which are seldom attacked include rhododendron, azalea, ash, beech, most of the oaks and maples, honeysuckle, redbud hydrangea, lilac, privet, forsythia, peony, petunia, tulips, gladiolus, and phlox.

State Foresters Open Congressional Hearing

(*Continued from page* 472)

planting stock for distribution to forest land owners; (4) by expanding forest research and by making effective the Norris-Doxey Act; (5) by completing the forest survey. He further recommended an amendment of the inheritance tax laws to grant exemption to well managed forest properties up to 10,000 acres in area in order to encourage people to manage them for sustained forest yields. Referring to the lands acquired by the Federal Government through the Resettlement Administration, he recommended that consideration be given to the possibility of establishing small colonies of persons "who would obtain at least part-time employment in the management of the forests and eventually in the wood-using industries dependent upon them."

In speaking for the states of Pennsylvania, Maryland, New Jersey, Delaware, Virginia, West Virginia and Kentucky, R. Lynn Emerick, State Forester of Pennsylvania, reviewed the needs of each state separately and made recommendations as to federal aid in line with those stated above.

Marcus Schaaf, State Forester of Michigan, represented the states of North Dakota, South Dakota, Kansas, Missouri, Iowa, Illinois, Indiana, Ohio, Minnesota, Wisconsin and Michigan. He pointed out that in the Prairie states conditions are quite different. Here broad sweeps of fertile prairies must be protected from wind erosion. To meet this problem he advocated increased help by the Federal Government in providing farmers with low priced trees for shelterbelt and woodlot planting; federal aid in educating landowners in the planting and maintenance of windbreaks and farm woodlots; federal and state acquisition of lands unsuited to private ownership; increased research into problems common to the region and reduced taxation on private land dedicated to forestry purposes.

For the region as a whole he supported the recommendations of the Association of increased federal aid in protecting forest properties from fire, the education of farmers and commercial forest owners in the reforestation and management of their lands and extension of governmental nursery facilities, increased participation by both state and federal agencies in forest research and tax adjustment on private lands dedicated to forestry.

Officers of the Association of State Foresters for the ensuing year, elected during the course of the meeting, are: President, Rutledge Parker, State Forester of Montana; Vice-President, J. O. Hazard, State Forester of Tennessee; Secretary, O. A. Alderman, State Forester of Ohio; member Executive Committee, F. D. Heyward, Jr., State Forester of Georgia.

WOOD USE TRENDS IN EUROPE

(*Continued from page* 441)

softwoods with hardwoods. Allowing for the additional expense of equipment, a saving of sixty to seventy-five per cent in operating expenses is reported, as compared with gasoline costing forty-five to sixty-five cents a gallon.

An appraisal of this European development as applied to the United States must recognize that our present gasoline supplies and prices make it uneconomical except under very exceptional location where wood is plentiful and gasoline inaccessible. Further, the resulting displacement of the petroleum industry would have tremendous ramifications in our domestic economy. With gasoline taxes in 1936 approximating $800,000,000, any considerable decrease in gasoline consumption would necessitate adjustments in governmental expenditures or shifts of the tax burden. More than that, the loss to private capital invested in the oil industry would have to be considered. Obviously, this involves more than is included in the relative efficiencies of the two types of fuels.

In Central Europe wood is used less for exterior wall construction of residences and other small buildings than in America; on the other hand, it is more widely used for framing in industrial buildings, public auditoriums, radio towers, railway stations, and other large structures.

Glued laminated arches, trusses, and beams for larger structures were used in Germany until war-time food necessities left no milk available for casein glue. This stimulated the development of mechanical fastenings which we term modern connectors. The improved efficiency which resulted has stimulated use of timber in structures that formerly were only possible or economical when built of other materials. Radio towers near Munich, 525 feet in height, and near Stuttgart, 620 feet in height, are examples. Stuttgart has a civic auditorium, largely of wood, which is 165 feet wide, 330 feet long with a central height of some eighty feet, and a seating capacity of 10,000 people.

The lesser cost of connector-built structures, and the inability to afford the luxury of a possible superior appearance is probably responsible for the failure of glued laminated construction to regain its pre-war popularity in Germany.

Swiss architects and engineers have a high regard for timber construction. They use connectors for outdoor and industrial structures, and glued laminated construction for auditoriums, gymnasiums, and the like, where laminated arches afford a more pleasing appearance than do structures framed with connectors. The glued laminated construction has been continuously popular since its introduction in 1909, and members have proved highly resistant to chemical deterioration. Consequently, it is widely used in structures where steel or the metal in connector-built wooden structures would be subject to corrosion. Examples are chemical factories, barns, riding academies, locomotive shops, and storage buildings.

Under normal European conditions, timber is ten to fifteen per cent cheaper than steel. Native coniferous species are preferred for construction because of lesser cost. The Munich radio tower previously mentioned, however, is built of American longleaf, called locally "pitch pine," treated with a wood preservative. Each base section corner post consists of four pieces whose cross section is nine by nine inches, while the posts in the next higher section are seventeen inches on a side.

Apparently, about ninety per cent of the plywood gluing in Europe is by the hot-press method and ten per cent by cold pressing, presumably with casein glue. About half of the hot pressing is done with phenolic-resin glues, and about half with urea-resin glues. One company claims to have a glue that will give high water resistance in either hot or cold press gluing.

Use of wood in aircraft is finding considerable interest among European investigators. It has been reported that when airplanes require an engine of 3,000 horsepower, which is now deemed highly probable, the propeller, if made of metal and of present design, will weigh more than the engine. Thought is, therefore, again being directed toward wooden propellers. German and English propellers are being constructed with the outer portion of the blade of a light-

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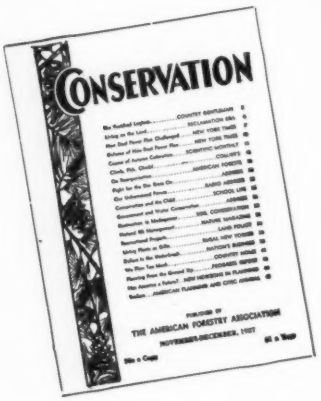

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weight wood, and the inner, or hub section, of laminated wood impregnated with phenolic resin. In some propellers hardwoods and softwoods are combined. Each lamination is sawed about one-eighth inch thick but is pressed so hard in the lamination process that its thickness is reduced by one-half. The resulting propeller is very dense with an exceedingly great shear strength, which is important because the blades are detachable and are screwed into special strength steel hubs. Two American manufacturers are experimenting with the production of wooden propellers of this type.

Over-production and reduced exports of naval stores from the Landes region with resulting low prices has caused the French Government to reduce production some thirty to forty per cent. Even so, prices continued too high to allow French naval stores to compete for export. Accordingly, a trade agreement was arranged with England permitting mine props from turpentined trees to be exchanged for coal. France faces the problem of protecting the turpentine woods against forest fires much as we do in the United States, for during the summer of 1937 some 30,000 acres were destroyed by fire. French turpentine suffers from substitutes in paint production, as in the United States, but some advantages are held to exist in the use of varnishes containing turpentine as compared with cellulosic varnishes.

Desiring to be self-sufficient in naval stores production, Germany's investigations have led her to adopt innovations in chipping practices which differ from either French or American methods. At Eberswalde and Bernau, operations are planned on eight year workings. The chipping starts from above and proceeds downward each year. Also, the gum is directed along the smooth surface of the cut to a central groove leading into a clay cup.

Viewed broadly, and recognizing the changes from one decade to another, it seems that Europe is trending toward a timber cut in excess of timber growth. This, combined with an increasing population and the difficulty of improving the growth from forests already comparatively well managed, indicates why improved utilization is recognized as so important. There seems little possibility that our domestic market will ever be threatened with a continuous flood of cheap European wood. On the contrary, world needs for wood, and especially for softwoods, outside of the United States, are tending to increase and the world's softwood resources are tending to diminish. This gives reason to believe that the United States can increasingly use its forest resources to supply world demands. To do so, however, we must take comprehensive and constructive measures to turn our present and future wastes into economic products.

THOMOMYS THE ENGINEER

(*Continued from page* 454)

stockmen dependent on this summer feed for their very existence are willing to contribute toward reducing the number of these animals.

Squirrels, prairie dogs, and pocket gophers are the animals most frequently concerned in those drives against destructive pests on the grazing lands. Squirrels and prairie dogs are comparatively easy, but Thomomys, the pocket gopher, is a different matter. He lives entirely underground and baits must be placed in his tunnels to be effective. This is a slow job for a man armed with a stout probe and a container of bait, who must tramp over the area seeking the active workings of individual gophers.

This Thomomys is an industrious rascal and he builds a complicated and interesting underground home, consisting of a nest cavity lined with soft grasses and rootlets in which he spends his sleeping and resting hours, and one or more feeding tunnels which may extend for many feet from the nest. They are often arranged more or less roughly as the spokes of a wheel, with the nest as hub. In digging out many of these tunnel systems an amazing amount of work has been uncovered. The total length of many runs is from 500 to 600 feet, while one was well over 900 feet. These feeding runways are marked on the surface by an irregular line of flattened fan-shaped mounds which indicate the dumps where Thomomys disposed of the surplus dirt when excavating. Each of these dumps is connected with the main tunnel by a short lateral, invariably plugged for at least part of its length by solidly packed earth.

Along this feeding runway are occasional small rooms used as food storehouses. They are filled with any storable material that is edible. In the mountains the bulbs of camas are so freely used that in some localities pocket gophers are known as "camas rats." The bulbs of the brodeaias, the Maripose tulips, the dog-toothed violets, and others are also stored by these animals against the time when the ground may be frozen and digging impossible.

Even in some of the mild valleys of the Pacific Coast country where the ground never freezes deep enough to interfere with his digging, Thomomys persists in these storage operations—a fact which indicates how deep rooted such instincts may be.

In the farming districts, Thomomys is more catholic in his tastes. Timothy bulblets and roots of alfalfa, or red clover cut into convenient lengths, roots of apple, filbert, prune and cherry treated in the same fashion, carrots, parsnips, potatoes, sweet potatoes—in fact, anything in the root crop line, tulips and other flowers—all these are eagerly accepted by him and carted to his storehouse.

He is so industrious in his work and so persistent in his efforts to fill these storehouses that many trees are root

pruned so severely that they die. On one place over $1,500 worth of seven-year-old filbert trees were killed in one season, while in one apple growing district in Oregon enough twelve-year-old trees were killed in one winter to have planted 240 acres of orchard.

In addition to these methods outlined, Thomomys does still another type of work. In regions where snow falls before the ground freezes, he delights in working along the surface, tearing up the crowns of plants and kicking up behind him dirt to fill the tunnel he is making in the snow. Often in digging deeper he fills the snow tunnels with dirt from below. When the snow melts away in the spring, a series of rope-like structures in more or less intricate pattern are left lying on the ground as evidence of his work.

One gopher can do an amazing amount of such work. Seven or eight to the acre can make a terrible looking mess of a meadow, while twenty to the acre—not an impossible number—working industriously, can make an area look as though it had been worked with a stirring plow. In the heavier soils this is not so serious unless all the plant crowns are destroyed, but in the lighter soils, which comprise the higher slopes of so many of the western mountains, it is disastrous. Once the root binders are gone, the first rain starts washing away the soil and in a few seasons only bare rock is left.

The pocket gopher, in addition to being a good construction engineer, is also a good housekeeper. All trash and refuse is carefully carted to little dumps built for that purpose. An underground home occupied by a normal pocket gopher in good health is always scrupulously clean. Perhaps it is this fussiness about his home which makes him so belligerent when a stranger intrudes. It is true that another gopher invading an occupied burrow is often attacked by the owner. The fight which follows usually goes on until one or the other of the combatants is dead. Like all rules, there are exceptions and frequently two or more of these animals are found occupying the same abode.

Thomomys is equally willing to fight any other intruder, as an incident of personal experience while trapping pocket gophers on a farm in western Oregon shows. One trap had been placed in a gopher burrow and the next one was being placed when the first one was sprung. Rushing over, the farm owner and myself found that we had a huge old male by the neck. The trap had not pierced his skin and he was unharmed, though extremely peeved at his predicament. Stepping well back from any open hole, I opened the trap and allowed Mr. Gopher to fall on the ground from a height of perhaps a foot. As he struck he bounded like a rubber ball and fastened his teeth in the farmer's overalls. He seemed to think he had a death grip and we had an interesting five minutes before we succeeded in prying him loose.

An old male is equally willing to face a dog or cat. And when he shows those powerful yellow teeth, backed by his ugly face and a powerful pair of shoulders, more than one dog, inexperienced in handling pocket gophers, has been known to decide that discretion was the better part of valor.

Thomomys is small as animals go, but at that his numbers are so great that collectively he is without doubt the most destructive to farm crops of all our native animals. He is with us the year around, his family is comparatively large, his food tastes vary greatly, and he is widely distributed over a vast territory. In other words, he has all the makings of a first class pest.

An infestation of ten pairs, or twenty gophers, to the acre can reduce the stand of alfalfa in a field by thirty per cent in two seasons. A vast amount of the winter kill in alfalfa in northern states is the result of the work of Thomomys.

Breaks in irrigation ditch banks, often causing serious damages, are the direct result of the tunneling proclivities of Thomomys. One such break in an eastern Oregon main ditch cost $1,500 for repairs, and left the entire project, in the middle of the irrigating season, for ten days without water.

A man may spend from eight to ten years of his life developing an orchard up to the beginning of production, only to have pocket gophers gnaw off all the roots of many trees. Often the tree can easily be pushed over.

Bulbs of all kinds are a regular banquet for gophers and the development of the bulb growing industry in the West has resulted in much gopher trouble. Narcissi of various kinds are bothered very little, but tulips, bulbous iris, lilies and smaller bulbs are greedily eaten.

Only a grower experienced in such matters can fully understand just how much damage a gopher can do in a bulb plantation. It isn't only the number eaten, but the number destroyed in his operations and the number stored that add to the score against him.

With such a record, is it any wonder that every man's hand is against Thomomys and that the human race is little inclined to credit him with his undoubted great ability as a construction engineer?

Thomomys and his relatives are spread over a tremendous area in the West—their range including practically all of the territory west of the Mississippi, parts of the Gulf States east of the Mississippi, and a goodly part of Mexico. Altogether there are 111 species and geographic races found in this territory, a good testimonial to the adaptability of this small engineer in meeting the variations in soil, climate, and living conditions throughout this immense area.

Fighting him and holding his numbers down is an immense job, but it can be done by careful work, using the proper materials and methods.

For this purpose the United States Biological Survey has a staff of trained research specialists who study the problems caused by these interesting animals. They are able to recommend suitable methods of control where needed.

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WHO'S WHO

Among the Authors in this Issue

CARLILE P. WINSLOW (*Wood Use Trends in Europe*) is America's foremost authority on wood utilization problems. A graduate of the Sheffield Scientific School of Yale University, he entered the Forest Service in 1908 and in 1917 succeeded to the directorship of the Forest Products Laboratory. During the World War and since, under his direction, the Laboratory gained much of the prestige which it at present holds in the field of wood research and utilization. Out of his observations during the summer of 1937 in England and France, and as a "fellow" of the Oberlaender Trust, in Germany, Czechoslovakia, Austria and Switzerland, grew this story on trends in wood uses in Europe today.

C. P. Winslow

LAWRENCE E. GRIFFIN (*When Salmon Meet Bonneville Dam*) is an educator of note, whose strongest interest is in marine zoology. As a Carnegie Fellow, he went to the Philippines in 1904 and later spent five years in the Islands, first as instructor in the Medical School and later as Dean of the then newly organized College of Liberal Arts. Dr. Griffin was one of the group which organized the University of the Philippines and he hopes some day to return to complete his studies on corals, begun at that time.

Lawrence E. Griffin

LEO A. LUTTRINGER (*Pymatuning*) is a wildlife specialist connected with the State game work in Pennsylvania. His work is well known to our readers. In this story he tells of the paradise for sportsmen which, long a dream of outdoor enthusiasts, has at last been realized on Pymatuning Lake.

IRA N. GABRIELSON (*Thomomys the Engineer*), Chief of the Bureau of Biological Survey at Washington, D. C., is a genial gentleman and a renowned wildlife expert. His introduction here of the busy little pocket gopher as an engineer of the first rank in the animal world is a fascinating and informative tale.

J. B. HARKIN (*Man's Brotherhood with the Wild*), for twenty-five years Commissioner of National Parks of Canada, retired in 1936. Mr. Harkin organized the National Parks Branch of the Canadian Government and was its first head, and his policy always was a vigorous one of expansion and development. He organized too the Advisory Board on Wild Life Protection which for over twenty years has operated so successfully to maintain a national perspective on wildlife matters in Canada. A brilliant writer and interested in all phases of man's contact with nature and wildlife, he draws aside in this story the veil of the past to prove that man's brotherhood with the wild dates back beyond the dawn of history into prehistoric times.

J. B. Harkin

VAN BEUREN W. DEVRIES (*Timber Connectors*) is Assistant Director of Information for the National Lumber Manufacturers Association, in Washington. A native New Yorker, educated at Williams College in Massachusetts, he is a former newspaper man with a penchant for all sports.

Van Beuren W. DeVries

G. H. COLLINGWOOD (*Bigleaf Maple*) continues his interesting Tree Series, as Forester of The American Forestry Association.

THE COVER—*October Sunset Over the Pines*—one of John Kabel's beautiful photographic studies.

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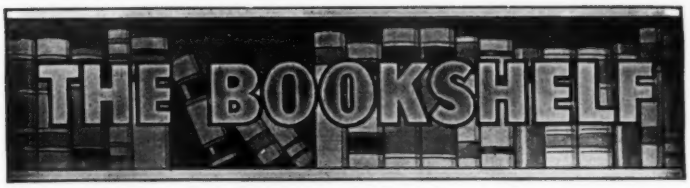

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